Dranetz-BMI PowerVisa® 440, PowerGuide® 4400 and PowerXplorer® PX5 Operational Skills

Course: TS-DB-PX5 (PQS104)

Date & Location: 12/11/08 Santa Clara, CA

Presented by:

PowerCET® Corporation

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Dranetz-BMI
PowerVisa 440,
PowerGuide® 4400 &
PowerXplorer® PX5
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Contents:

- Module 1: Hardware and Basic Operation
- Module 2: Real-Time Monitoring
- Module 3: Long-Term Monitoring
- Module 4: Viewing Event Data on 4400 / PX5

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Safety Precautions

The following safety precautions must be followed whenever any type of voltage or current connection is being made to the PowerGuide® or PowerXplorer®

- Wear Safety glasses and insulated gloves when making connections to power circuits
- Hands, shoes and floor must be dry when making any connection to a power line
- Before each use, inspect all cables for breaks or cracks in the insulation
- Set the PowerGuide® / PowerXplorer® power switch to Off
- Before connecting to electric circuits to be monitored, open their related circuit breakers or disconnects. DO NOT install any connection of the monitor to live power lines
- Connections must be made to the monitor first, then to the circuit to be monitored

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(1) Hardware and Basic Operation

- Features and Controls
- Accessories
- Current Probes
- Basic Operation

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Features and Controls

- 360 x 240 (1/4 VGA) pixel backlit color LCD Touch Screen, 3.75” x 4.75”
- 8” x 12” x 2.5”
- Weight: 4.2LBS

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Status Lights, On/Off Switch

1 Battery Charge Indicator
- Steady = Charging
- Blinking = Charged

2 Status Indicator
- Off = Normal
- On = Abnormal condition

3 Power Indicator
- Blinking = Normal

4 On/Off Button

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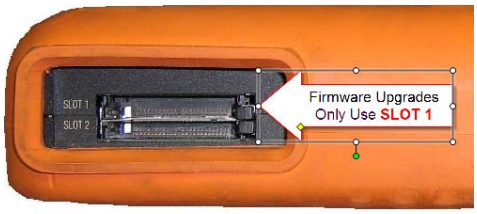
Program Cards®

- Firmware upgrades are downloaded from Web, put onto a CF card with a PC, and loaded from CF Card in the top slot (#1)

(Insert/remove only with power off)

- Card with firmware should be removed from slot 1 after upgrading.



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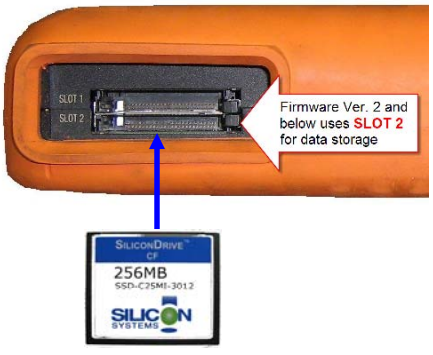
External Memory

******Firmware Version 2 (and below)******

- Compact Flash Memory Cards
  - Only Dran-BMI 32M - 256M Cards guaranteed to work
  - 32M minimum required
  - Use either slot, **SLOT #2 PREFERRED**
  - Only 1 memory card may be used at a time
- Optional Compact Flash Card Adapters (for personal computer):
  - PC Card (PCMCIA)
  - USB



******Firmware Version 2 (and below)******

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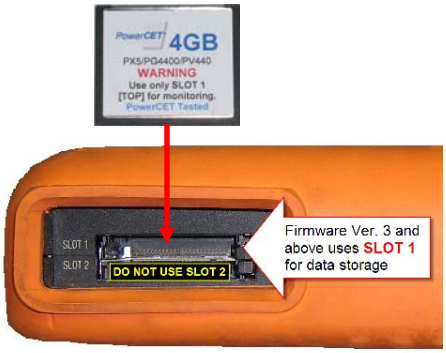
External Memory

******Firmware Version 3 (and above)******

- Compact Flash Memory Cards
  - Only Dranetz-BMI 32M – 32GB Cards guaranteed to work
  - 32M minimum required…4GB recommended.
  - Use card **SLOT #1 ONLY!**
  - File size option menu
    - 32 MB
    - 64 MB
    - 128 MB (Default Setting)
    - 256 MB
  - Only 1 memory card may be used at a time



******Firmware Version 3 (and above)******

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External Memory Card Adapters

- Optional Compact Flash Card Adapters (for personal / laptop computer):
  - PC Card (PCMCIA)
  - USB

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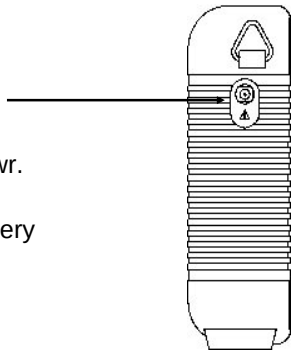
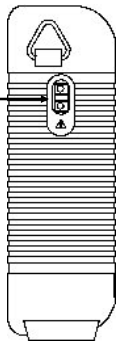
Outside Connections



- AC/Battery Operation
  - 90-265VAC, 50-60Hz External Pwr. Supply
  - 2-3 hours operation on (new) battery
  - 4-hour charging time



- Optical Data Port
  - External Communication Adapters:
    - Fiber optic - RS232, ext modem (v1.5)
    - Fiber optic - USB
    - Fiber optic - IP-addressable Ethernet

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Voltage, Current Channels

VOLTAGE CHANNELS
- 4 Fully Differential Voltage Channels,1-600VRMS
- Transient Voltage Measurement: 50-1000VPk

CURRENT CHANNELS
- 4 independent Current Channels
- Range of 10-200% of attached current probe rating
- 1.5Vrms w/3:1CF (4.5Vpeak max). 3.0Vrms w/1.5:1CF.

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Frequency Ranges

- **Model PowerGuide 4400**
- 2 user selectable ranges:
  - 30 - 70 Hz default, with up to 25% Vthd
  - 5 - 30 Hz
- **Model PowerVisa 440**
  - No answer modules
  - No preprogrammed Inrush & Fault Recorder modes.
  - Post cycle capture limited to 100 cycles.
- **Model PowerXplorer PX5-XFAST**
- 2 user selectable ranges:
  - 30 - 70 Hz default, with up to 25% Vthd
  - 15 - 30 Hz
- **Model PowerXplorer PX5-400**
- 2 user selectable ranges:
  - 30 - 70 Hz default, with up to 25% Vthd
  - 380 - 440 Hz (reduced accuracy with 32 samples/cycle)

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Sample Rate

- **60 Hertz Resolution**
  - **256 Samples/cycle**
- **Harmonics**
  - **200 ms window**
  - **Displayed to 63rd Harmonic**

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Calculated Parameters

- True Average Power
- Apparent Power
- Fundamental Apparent Power
- Fundamental Power
- Volt Ampere Reactive
- True Power Factor
- Displacement Power Factor

For Details, see Appendix B Users Manual

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Standard Accessories

- User's Guide
- Voltage Cable Set, Clips, Pouch
- Battery Charger/AC Adapter
- Battery
- Easel/Hanger Bracket
- Carry Strap
- Protective Rubber Boot

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Optional Accessories

- Compact Flash Memory Cards: 32 / 64 / 128 / 256M
- Current Probes
- External Communication Adapters
- Portable Field Printer
- Secure Monitoring Enclosure
- Carrying, Shipping Cases
- Electrical Energy Mgmt. Field Handbook
- PQ Analysis Field Handbook
- Phase Power Adapter

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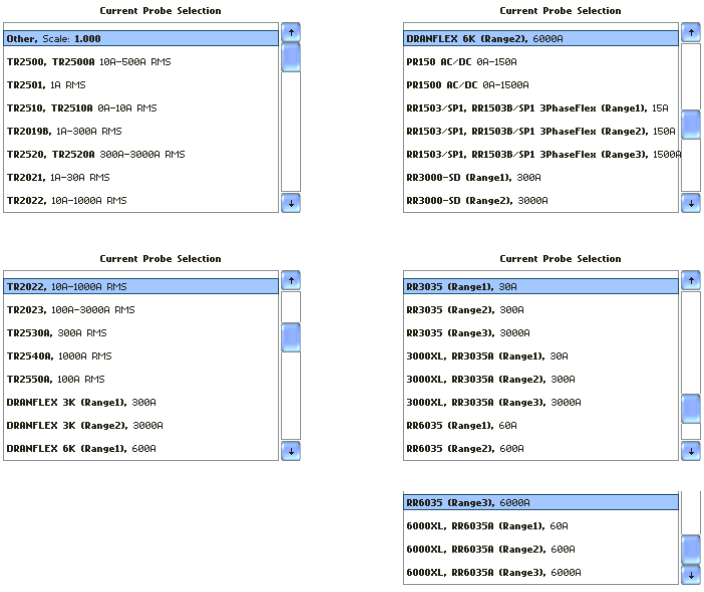
Current Probe Selection List



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Current Probes - 1

AC Current Clamps

- *(440/4400/PX5/PP4300 compatible connector: Hypertronics Model D01PB406MST connector 4 pin male.)*
- TR-2501 100MA to 1.2A CT
  - TR-2530A 20A-300ARMS CT
  - TR-2540A 10A-1000A CT
  - TR-2550A 1A-100ARMS CT
  - TR-2510A 1A-10ARMS CT
  - TR-2500A 10A-500ARMS CT
  - TR-2520A 100A-3000ARMS CT
  - *TR-2021 1A-30A CT, high bandwid
  - *TR-2019B 50A-300A CT, high bandwidth
  - *TR-2022 10A-1000A CT, high bandwidth
  - *TR-2023 200A-3000A CT, high bandwidth

Requires CA4300 Adapter

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Current Probes - 2

Flexible Probes and Accessories

- **DRANFLEX 3003XL incl power supply**
- **DRANFLEX 3K**
- **DRANFLEX 6K**
- **RR3035A***
- **RR6035A***
- **3000XL (aka DRANFLEX3000XL)**
- **6000XL (aka DRANFKEX6000XL)**
- RR3035*
- RR6035*
- RR3000-SD*

BLUE = 1.5v output @ full scale
RED = 3v output @ full scale
* Requires CA4300BNC or A-CPA-MBNC-PX5 adapter

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Current Probes - 3

- ***Flexible Probes and Accessories***
  - 3-Range 30/300/3000A
    - ACP3003_3/24 (3v output)
    - ACP3000_3/24 (3v output)
    - ACP3000_1/24 (1.5v output)
  - 3-Range 60/600/6000A
    - ACP6003_3/24 (3v output)
    - ACP6000_3/24 (3v output)
    - ACP6000_1/24 (1.5v output)
  - Notes
    - Pro~flex ACP probes listed above are terminated with a MBNC connector and require the A-CPA-FBNC-PX5 adapter to connect to the Dranetz current channel inputs
    - Pro~flex ACP probes are available in the following standard lengths
      - **24”**
      - **36”**
      - **48”**
      - **Custom lengths available**

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Current Probes Cross Reference

Current Probe Selection Menu Cross Reference		
Current Probe Model (Range)	**Current Probe Selection Menu**	
	Other (Scale)	**Entry (Menu Listing) Selection**
ACP3000_1 (Range 1) 30A	**20**	**3000XL, RR3035A (Range 1) 30A**
ACP3000_1 (Range 2) 300A	200	3000XL, RR3035A (Range 2) 300A
ACP3000_1 (Range 3) 3000A	**2000**	**3000XL, RR3035A (Range 3) 3000A**
AEMC NM261 (Range 1) 20A	10	RR3035 (Range 1) 30A
AEMC NM261 (Range 2) 200A	**100**	**RR3035 (Range 2) 300A**
AEMC SR261 (Range 1) 10A	10	RR3035 (Range 1) 30A
AEMC SR261 (Range 2) 100A	**100**	**RR3035 (Range 2) 300A**
AEMC SR261 (Range 3) 1000A	1000	RR3035 (Range 3) 3000A
ACP3000_3 (Range 1) 30A	**10**	**RR3035 (Range 1) 30A**
ACP3000_3 (Range 2) 300A	100	RR3035 (Range 2) 300A
ACP3000_3 (Range 3) 3000A	**1000**	**RR3035 (Range 3) 3000A**
Fluke i200s (Range 1) 20A	10	RR3035 (Range 1) 30A
Fluke i200s (Range 2) 200A	**100**	**RR3035 (Range 2) 300A**
Fluke i1000s (Range 1) 10A	10	RR3035 (Range 1) 30A
Fluke i1000s (Range 2) 100A	**100**	**RR3035 (Range 2) 300A**
Fluke i1000s (Range 3) 1000A	1000	RR3035 (Range 3) 3000A

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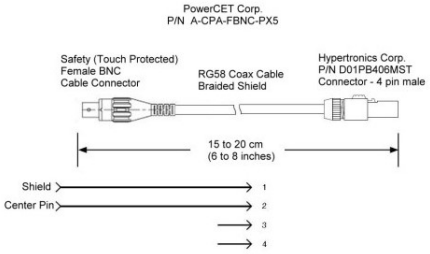
Current Probe Adapters

- ***Current Probe Adapter***
  - *A-ACP-FBNC-PX5 (a male BNC adapter is also available under the part number A-ACP-MBNC-PX5 or*



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Current Probes - 3

AC/DC Current Probes

•PR150/SP2 150A CT (9v Battery Powered)
•PR1500/SP8 1500A CT (9v Battery Powered)
•PR150/SP1 150A CT (Requires AC adapter)
•PR1500/SP7 1500A CT (Requires AC adapter)
•ACADP-PR9VUS (AC Adapter)

Each probe requires separate ac adapter

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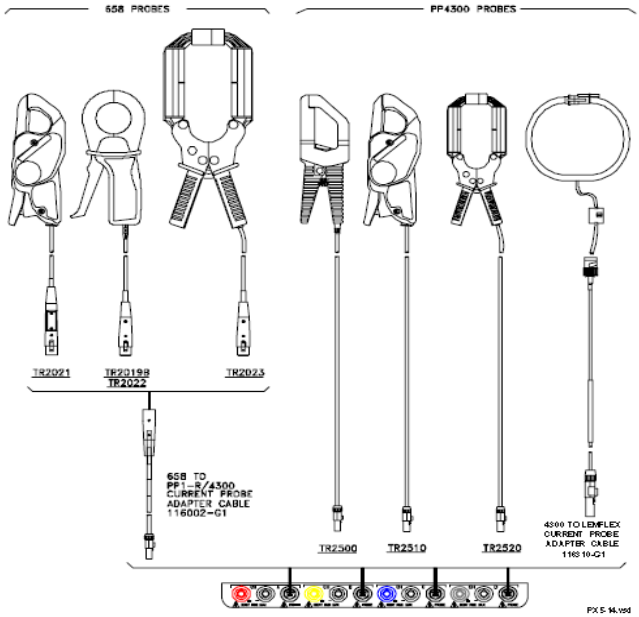
Current Probes - 4



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Current Probes - 5

P/N TR-2500

P/N TR-2510

P/N TR-2520

P/N TR-2500A

P/N TR-2510A

P/N TR-2520A

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Optional Accessories: Software

- Node-Link™
  - Transfers data via optical port to a PC

- DranView™
  - View & Analyze Event Data
    - Professional
    - **Enterprise**

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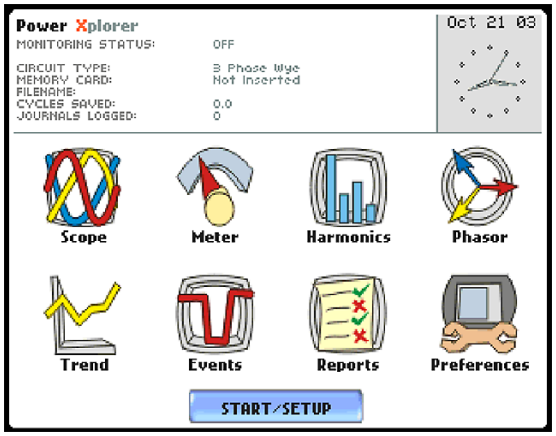
Basic Operation: Touch Screen

- Use finger or PDA-type stylus
- Usable with gloves on
- Icon movement / audible beep confirm touch
- Backlight times out, touch to restore



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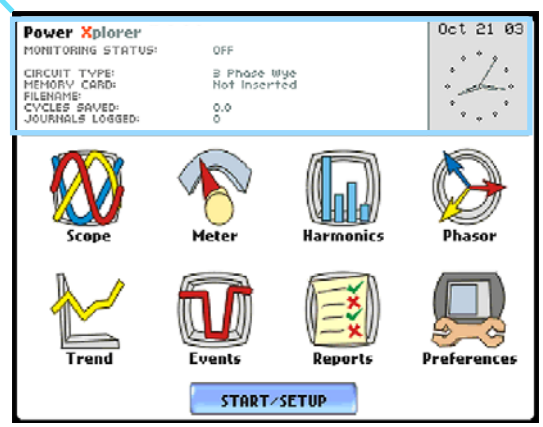
Basic Operation: Home Screen

- Status Display
  - Model, Firmware Version, Current Date and Time
  - Monitoring Status (On, Off, Done, Armed)
  - Circuit Type
  - Memory Card Status
  - Data Filename
  - # Events Saved
  - # Journal Logs



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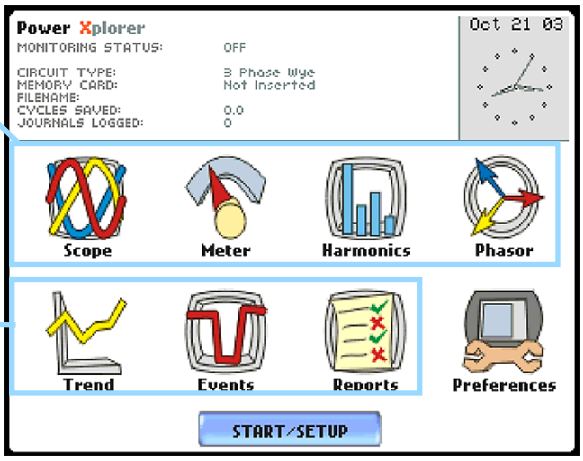
Basic Operation: Home Screen

- Home Screen Icons
  - Real-Time Displays
    - Scope
    - Meter
    - Harmonics
    - Phasor
  - Recorded Data
  - Displays
    - Trend
    - Events
    - Reports



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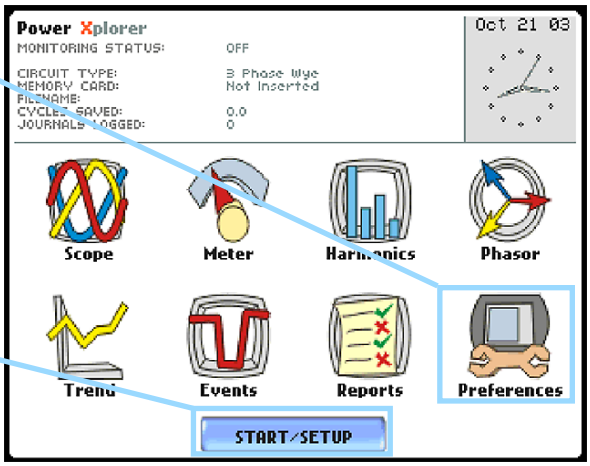
Basic Operation: Home Screen

- Preferences
  - Time & Date
  - Languages
  - LCD Display
  - Beeper
  - Communications
  - Memory Card
- Start/Setup Button
  - Setup and Start/Stop Monitoring



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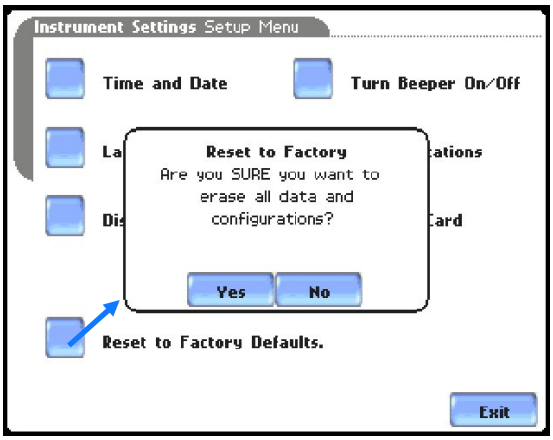
Basic Operation: Reset to Factory Defaults

- Performs firmware upgrades with newer version in slot 1 at Power Up
- From the Home Screen, *Press*: Preferences Icon
- *Press*: Reset to Factory Defaults



- ***Press*: Yes to reset Xplorer**
- **Caution: Erases all internal settings and data**

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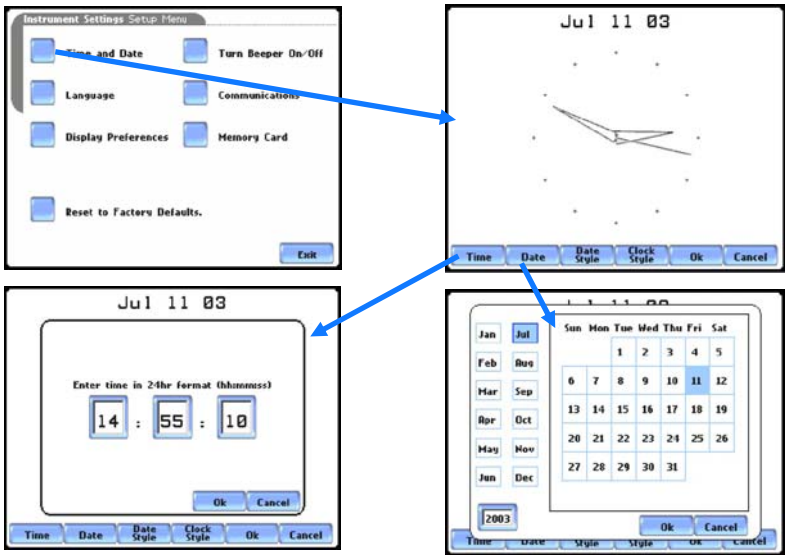
Basic Operation: Setup-Set Time & Date

•From the Home Screen, *Press*: Preferences Icon

•Set Correct Time and Date



•Optional: Choose Clock Style (Analog, Digital 12 Hr. or Digital 24 Hr.)

•Optional: Choose Date Style (mm/dd/yy, dd/mm/yy, yy/mm/dd)

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Basic Operation: Setup - Display

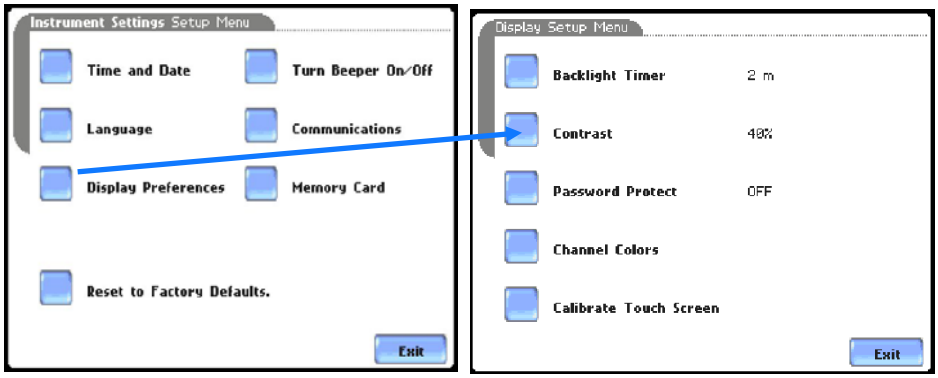
•From the Home Screen, *Press*: *Preferences* Icon

•*Press*: *Display Preferences*

•Turn on Password protection if desired

•Adjust Contrast for best visibility (changing temps changes contrast)

•Calibrate touch screen if necessary *(recommended)*



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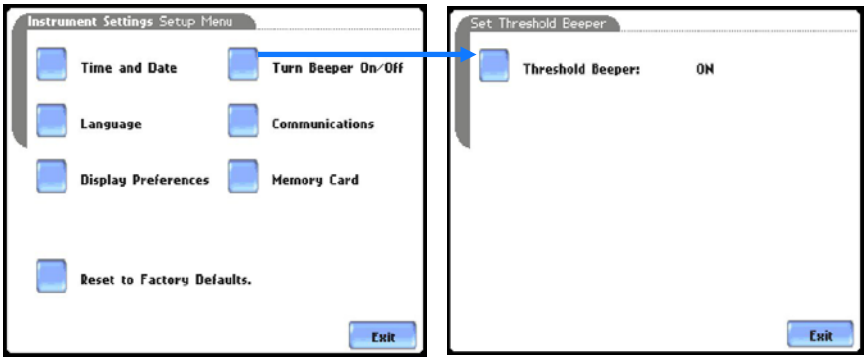
Basic Operation: Setup - Beeper

- *Press*: Turn Beeper On/Off
- Beeps when thresholds crossed (touch-click feedback unaffected)



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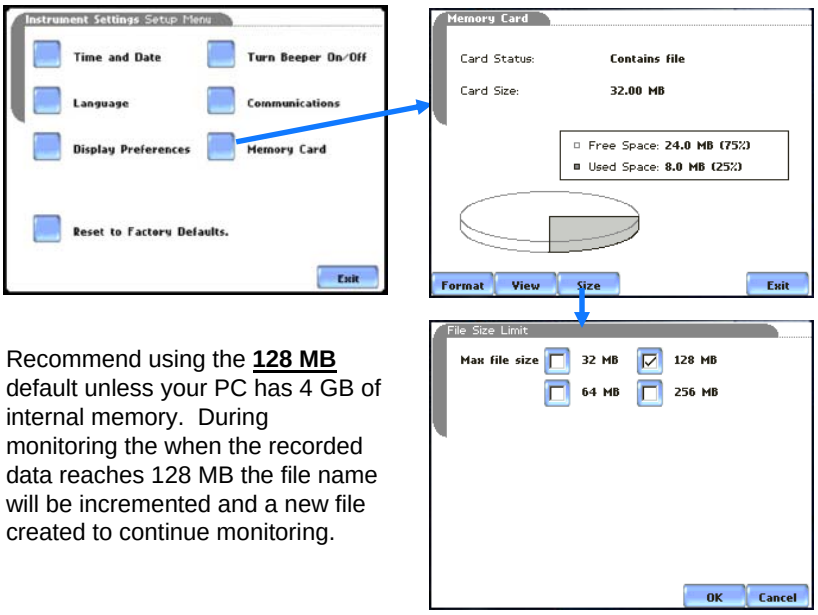
Basic Operation: Set File Size

- **From the Home Screen, *Press*: Preferences**
- ***Press*: Memory Card**



Recommend using the **128 MB** default unless your PC has 4 GB of internal memory. During monitoring the when the recorded data reaches 128 MB the file name will be incremented and a new file created to continue monitoring.

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Workbook Modules:

1 Hardware and Basic Operation

2 Real-Time Monitoring

3 Long-Term Monitoring

4 Viewing Event Data on the 4400 / PX5

5 Viewing Event Data in DranView

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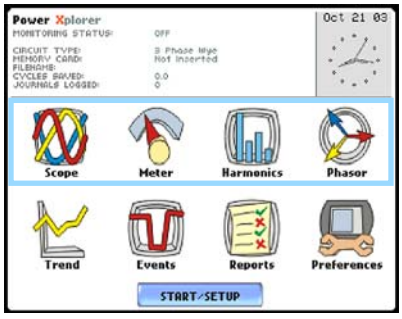
(2) Real-Time Monitoring

- Real-Time Monitoring*
  - Hookup
  - Setup
  - Scope Mode
  - Meter Mode
  - Harmonics
  - Phasors



* Note: use of Real-Time monitoring screens does not affect or interrupt any long-term monitoring in progress

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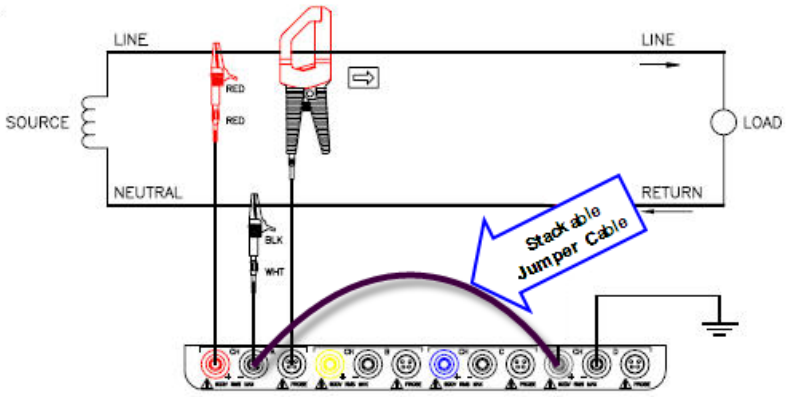
Hookup

- Connect unit to 120V single-phase circuit.



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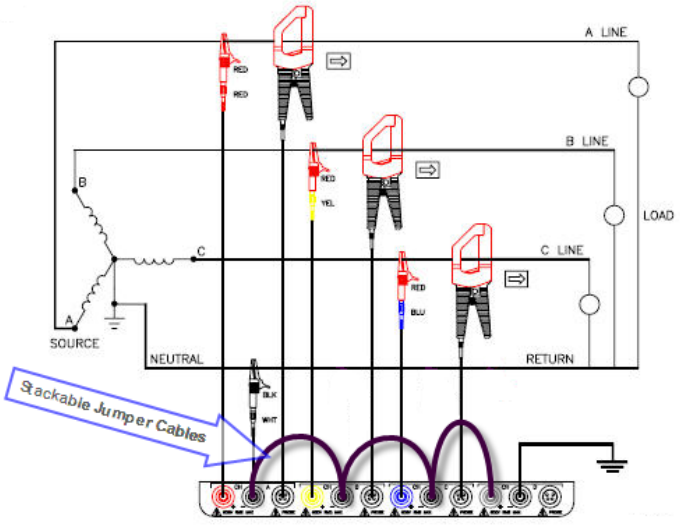
Hookup

- Three phase circuit connection with stackable jumpers.



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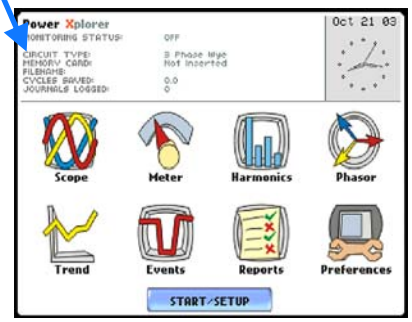
Verify/Change Setup as Needed

- **On power up, 4400 & PX5 use the last used setup (note circuit type on status display for a reminder)**
- **Verify correct setup before using real-time monitoring screens for accurate measurements. Options:**
  1. **Use the existing setup if the equipment and circuit haven't changed since last use (view setup-> summary to verify probes / circuit / scale factors)**
  2. **Use Automatic Setup. *Press Probe* if you need to change current probes**
  3. **Use the Wizard Setup to manually setup the unit**
  4. **Load a known setup template from memory card**



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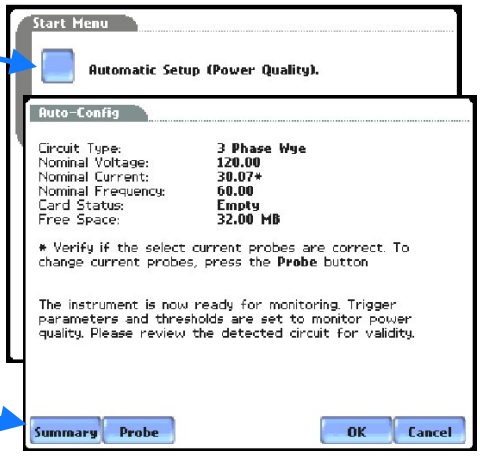
Automatic Setup

- From Home Screen, *Press: Start/Setup*
- *Press: Automatic Setup*
- *(auto setup runs)*
- Verify that information on Auto-Config screen is correct
- *Press: Summary* to for more configuration information


Start Menu
Automatic Setup (Power Quality).
Auto-Config
Circuit Type: 3 Phase Wye
Nominal Voltage: 120.00
Nominal Current: 30.07*
Nominal Frequency: 60.00
Card Status: Empty
Free Space: 32.00 MB
* Verify if the select current probes are correct. To change current probes, press the Probe button
The instrument is now ready for monitoring. Trigger parameters and thresholds are set to monitor power quality. Please review the detected circuit for validity.
Summary
Probe
OK
Cancel

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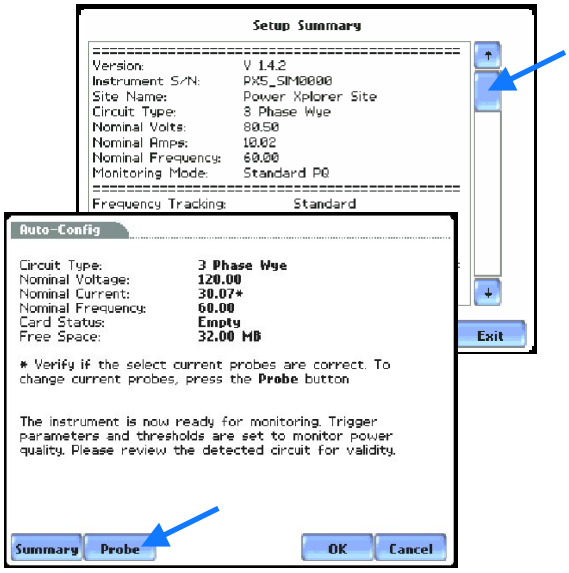
Setup Summary

- Scroll down by dragging the scroll bar
- Check the current probes and scale factors
- *Press: Exit*
- *Press: Probe* to correct current probe selection and scale factors if necessary


Setup Summary
Version: V 1.4.2
Instrument S/N: PX5_SIM0000
Site Name: Power Xplorer Site
Circuit Type: 3 Phase Wye
Nominal Volts: 80.50
Nominal Amps: 10.02
Nominal Frequency: 60.00
Monitoring Mode: Standard P0
Frequency Tracking: Standard
Exit
Auto-Config
Circuit Type: 3 Phase Wye
Nominal Voltage: 120.00
Nominal Current: 30.07*
Nominal Frequency: 60.00
Card Status: Empty
Free Space: 32.00 MB
* Verify if the select current probes are correct. To change current probes, press the Probe button
The instrument is now ready for monitoring. Trigger parameters and thresholds are set to monitor power quality. Please review the detected circuit for validity.
Summary
Probe
OK
Cancel

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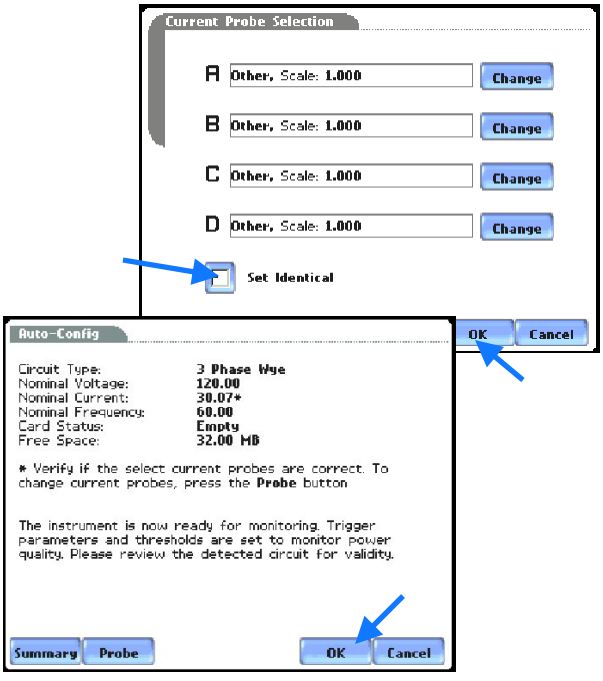
Current Probe Selection

- ***Press Change*** **to choose the probe for each channel from the menu**
- ***Press Set Identical*** **if using identical probes for all channels**
- **If your current probe is not on the list, select *Other***
- ***Press OK*** **when finished**
- ***Press OK*** **on Auto-Config Screen to return to Home Screen**


Current Probe Selection
A Other, Scale: 1.000 Change
B Other, Scale: 1.000 Change
C Other, Scale: 1.000 Change
D Other, Scale: 1.000 Change
Set Identical
OK
Cancel
Auto-Config
Circuit Type: 3 Phase Wye
Nominal Voltage: 120.00
Nominal Current: 30.07*
Nominal Frequency: 60.00
Card Status: Empty
Free Space: 32.00 MB
* Verify if the select current probes are correct. To change current probes, press the Probe button
The instrument is now ready for monitoring. Trigger parameters and thresholds are set to monitor power quality. Please review the detected circuit for validity.
Summary
Probe
OK
Cancel

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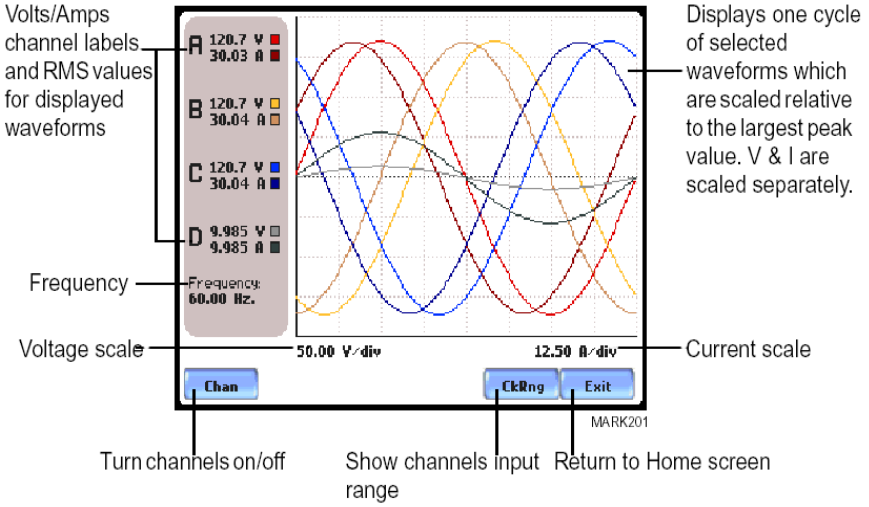
Scope Mode: Screen Layout

From the Home screen, *press: Scope*


Volts/Amps channel labels and RMS values for displayed waveforms
A 120.7 V 30.03 A
B 120.7 V 30.04 A
C 120.7 V 30.04 A
D 9.985 V 9.985 A
Frequency
Frequency: 60.00 Hz.
Displays one cycle of selected waveforms which are scaled relative to the largest peak value. V & I are scaled separately.
Voltage scale
50.00 V/div
12.50 A/div
Current scale
Chan
ClkRng
Exit
MARK201
Turn channels on/off
Show channels input range
Return to Home screen

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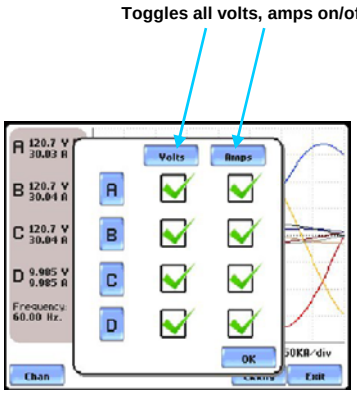
Scope Mode: Turning channels On/Off

- From the Scope screen, *press: Chan*
- Toggle individual channels, and/or rows and columns of channels on/off
- Turn off unused channels
- *Press OK*



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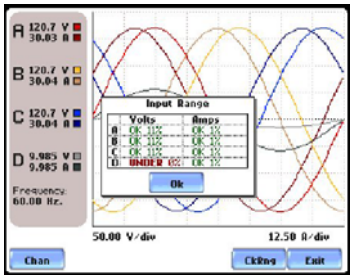
Scope Mode: Check Range

- From the Scope screen, *press: CkRng*
- *Input range display shows the % of the instruments full range detected on each channel*
- OK = Within Range
- OVER = Over Range
- UNDER = Under Range
- N/A = Channel Disabled
- CLIP = Clipping
- *Press: OK*



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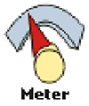
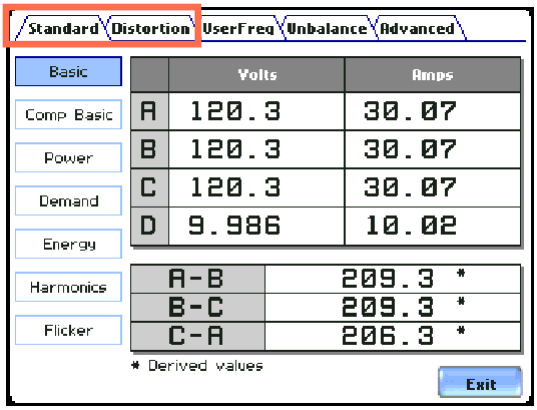
Meter Mode: Standard Meter Tab, Basic

- From the Home Screen, Press: Meter
- *Only **Standard** and **Distortion** tabs are available on **PowerGuide 4400** and **PowerVisa 440***





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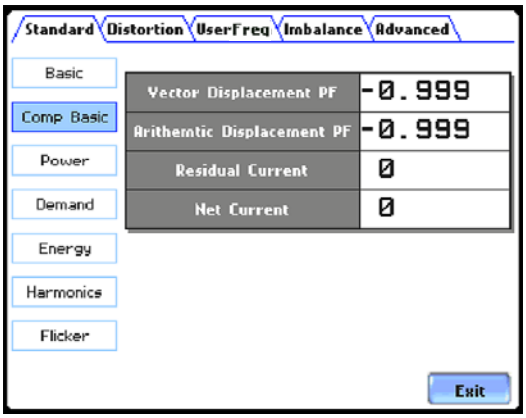
Meter Mode: Standard Meter Tab, Computed Basic

- *Press: Computed Basic*
- Lag (inductive) is plus, lead (capacitive) is minus when energy is delivered to the load
- Residual Current = Vector sum of the phase currents w/o neutral
- Net Current = Vector sum of the phase currents and neutral (i.e. leakage current)



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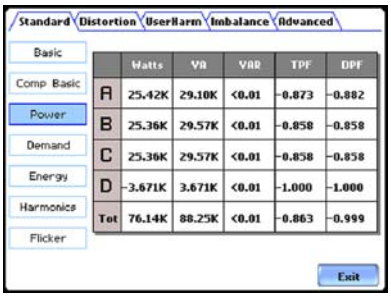
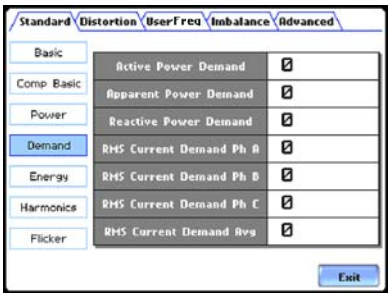
Meter Mode: Standard Meter Tab: Power & Demand

Press: Power



Press: Demand

(parameter measured over time, starts as zero)



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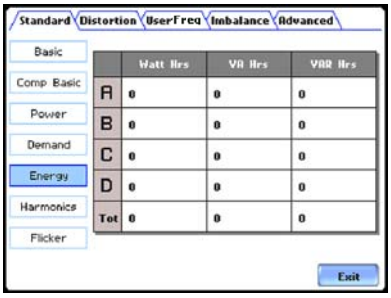
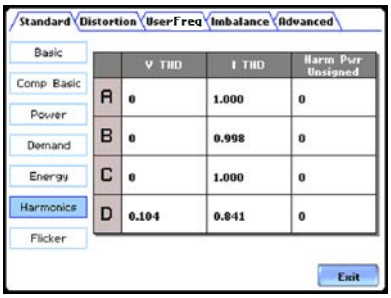
Meter Mode: Standard Meter Tab: Energy & Harmonics

Press: Energy

(parameter measured over time, starts as zero)



Press: Harmonics



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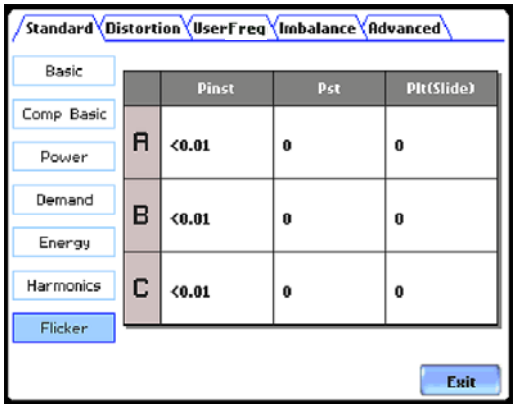
Meter Mode: Standard Meter Tab, Flicker

Press: Flicker

(parameter measured over time, starts as zero)



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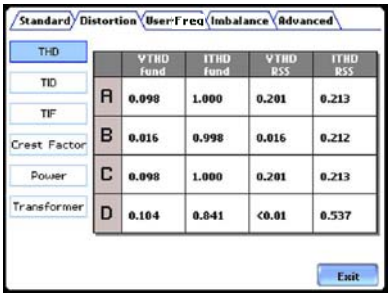
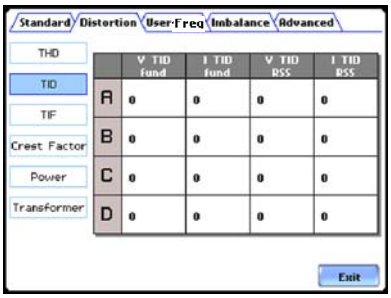
Meter Mode: Distortion Meter Tab: THD & TID

Press: Distortion Tab, THD
RSS=root sum of square



Press: TID (Total Interharmonic Distortion)



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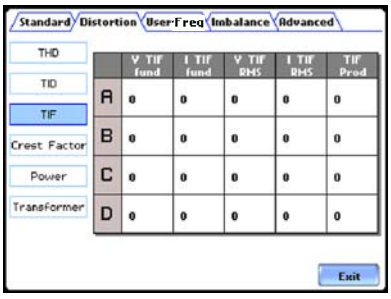
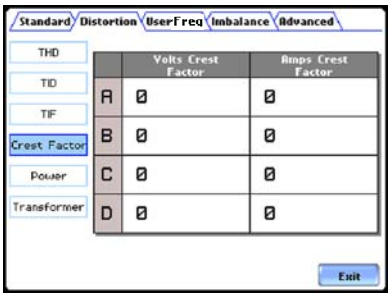
Meter Mode: Distortion Meter Tab: TIF & Crest Factor

Press: TIF (Telephone Influence Factor)



Press: Crest Factor



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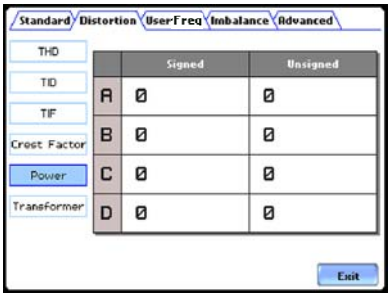
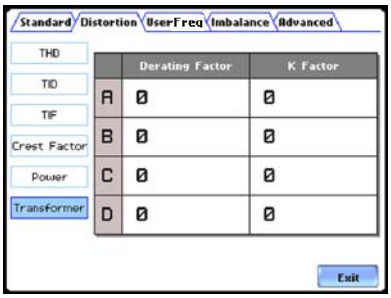
Meter Mode: Distortion Meter Tab: Power & Transformer

Press: Power



Press: Transformer



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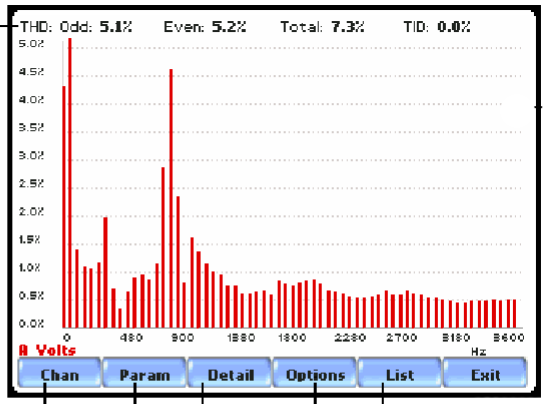
Harmonics: Graph

From Home Screen, *Press: Harmonics Icon*

Total harmonic distortion (THD) on Odd contribution and Even contribution based on 127 harmonics*



Switch channel display

Switch to V, I, or W

Zoom in to desired range of frequencies

Set harmonic options

Show harmonics text

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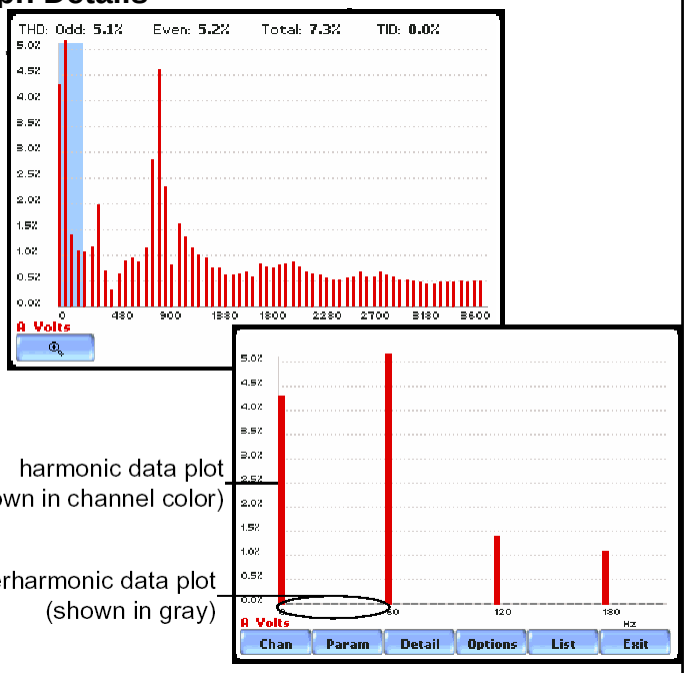
Harmonics: Graph Details

- *Press: Detail*
- *Drag <- -> highlight (blue) area to harmonics of interest*
- *Press the magnifying Glass*



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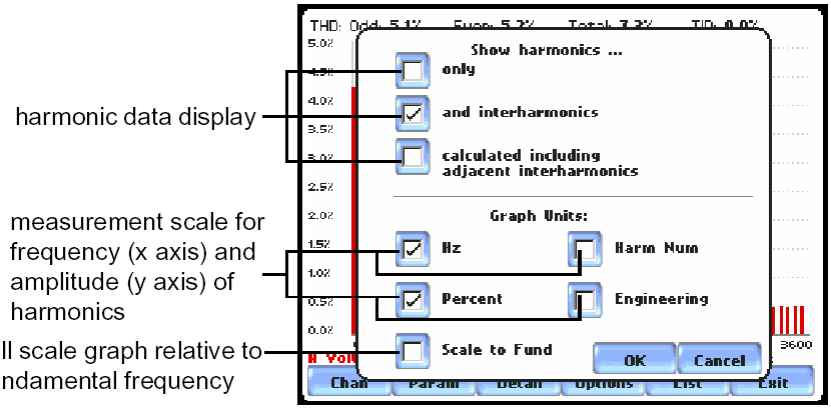
Harmonics: Graph Options

- *Press: Options*
- *Check Harmonics only* if you are not interested in interharmonics
- *Check* the desired graph units and scaling



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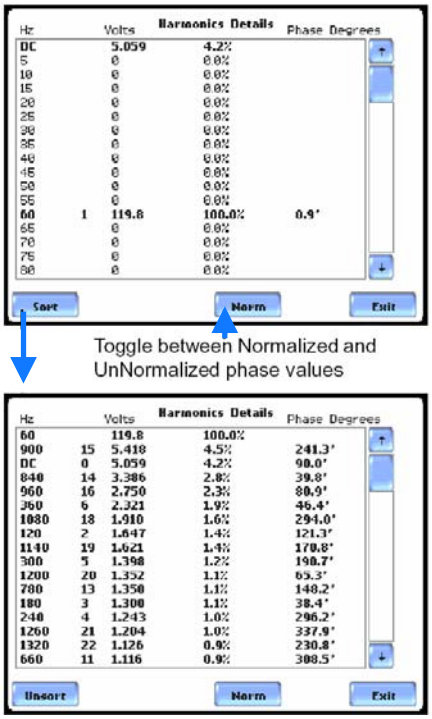
Harmonics: List

- *Press: List*
- *Press Sort* to organize by decreasing magnitude
- *Press Norm* to toggle between normalized and un-normalized values



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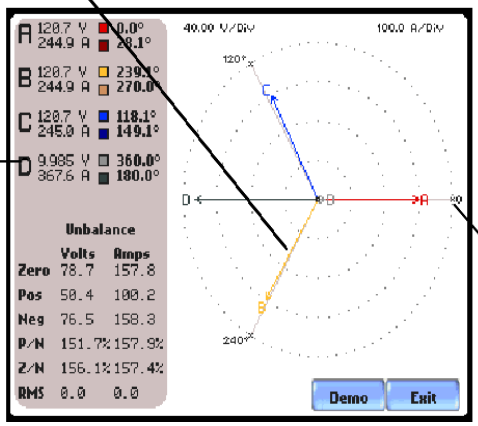
Phasors

- From Home screen, *Press: Phasors*
- Demo displays animated phasor display

Correct rotation is clockwise from 0°

If a channel is less than 20% of the maximum voltage (or current), the phasor is not displayed



Sync channel is displayed at 0° - normally channel A voltage

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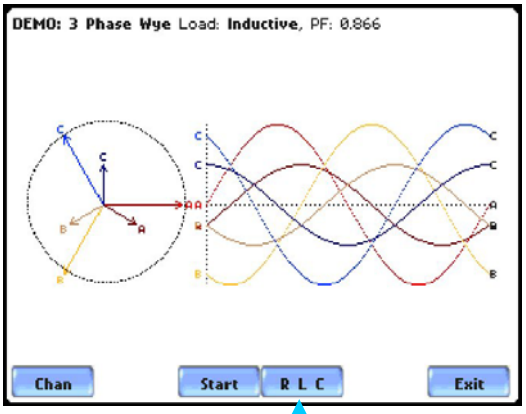
Phasors

- *Press: Demo*
- Demo displays animated phasor display



Chooses Resistive / Inductive / Capacitive Load

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Contents:

1 Hardware and Basic Operation

2 Real-Time Monitoring

3 Long-Term Monitoring

4 Viewing Event Data on the 4400 / PX5

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(3) Long-Term Monitoring

- Setup a new circuit: Automatic Setup
- Setup a new circuit: Wizard Setup
- Save a setup template to a card
- Load a setup template from a card

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Monitoring Terminology

- PARAMETER THRESHOLD: A user-defined measurement limit beyond which an event is triggered
- EVENT: An instantaneous snapshot of circuit data triggered by a parameter threshold crossing
- WAVEFORM CAPTURE: The saving of multiple cycles of waveform data from the time of an event
- SETUP: A collection of parameter thresholds, waveform capture settings, timed data logging and input configuration info that determine the data that will be saved during a monitoring session

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3-Phase Wye Hookup: Steps

- Use appropriate safety gear
- Connect Probes to unpowered monitor first
- Deactivate AC circuit
- Don't connect to circuits >600VRMS!
- Make ground connections first
- Connect voltage probes and clamp on current probes
- Use jumpers to avoid multiple neutral connections
- Double check connections are correct and secure
- Tag area with safety markers
- Reactivate AC circuit
- Turn on monitor
- Check circuit detection in smart start

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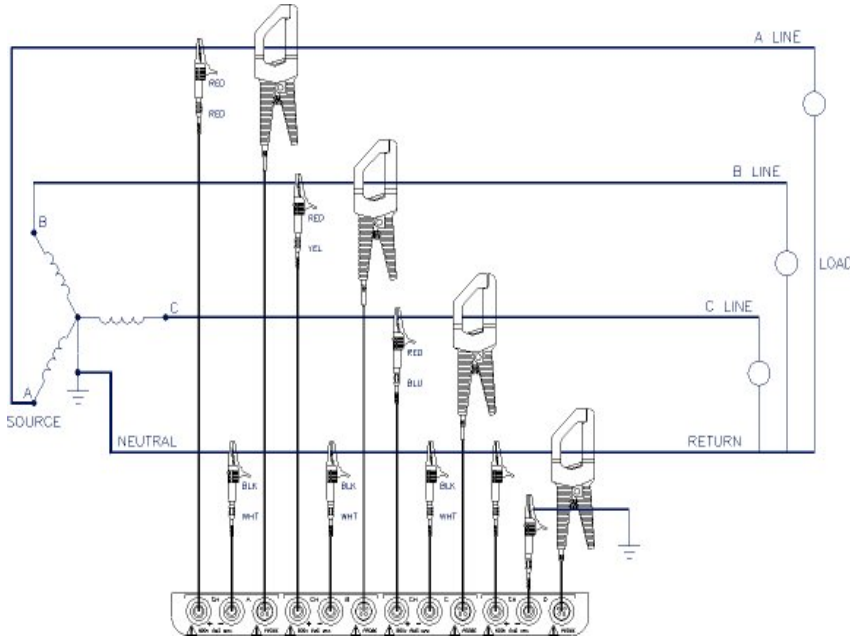
3-Phase Wye Hookup: Connections



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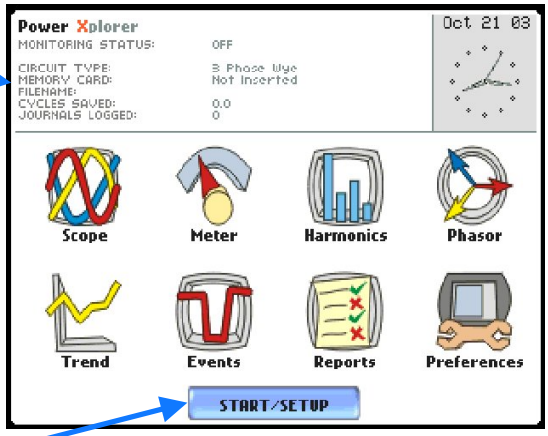
Start Menu

- On power up, 4400 & PX5 use the last used setup (note circuit type on status display for a reminder)



- From Home Screen, Press: Start/Setup

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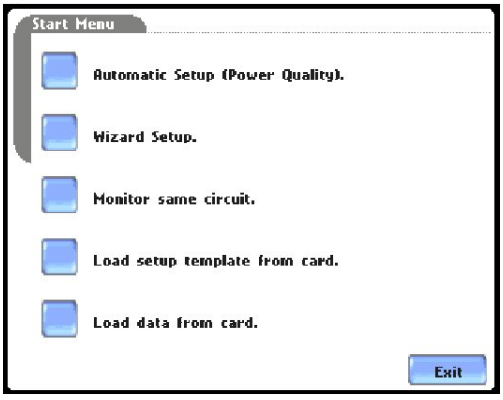
Setup Choices

- Use *Automatic Setup (Power Quality only)*. *Press Probe* if you need to change current probes. Or:
- Use the *Wizard Setup* to manually setup the unit . Or:
- Use *Monitor Same Circuit* if the equipment and circuit haven't changed since last use (view setup-> summary to verify probes / circuit / scale factors). Or:
- *Load a setup template* from memory card that matches your application *(preferred method)*



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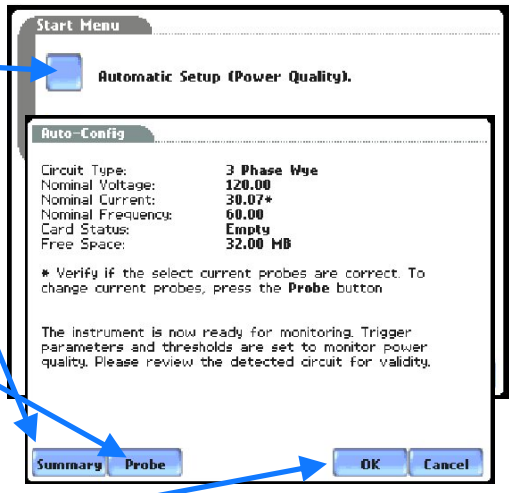
Automatic Setup

- *Press: Automatic Setup*
- *(auto setup runs)*
- *Press: Summary* to verify correct configuration
- If necessary, *Press: Probe* to correct current probe selection
- *Press: OK*, to go to Monitoring Screen, ready to start monitoring


Start Menu
Automatic Setup (Power Quality).
Auto-Config
Circuit Type: 3 Phase Wye
Nominal Voltage: 120.00
Nominal Current: 30.07*
Nominal Frequency: 60.00
Card Status: Empty
Free Space: 32.00 MB
* Verify if the select current probes are correct. To change current probes, press the Probe button
The instrument is now ready for monitoring. Trigger parameters and thresholds are set to monitor power quality. Please review the detected circuit for validity.
Summary
Probe
OK
Cancel

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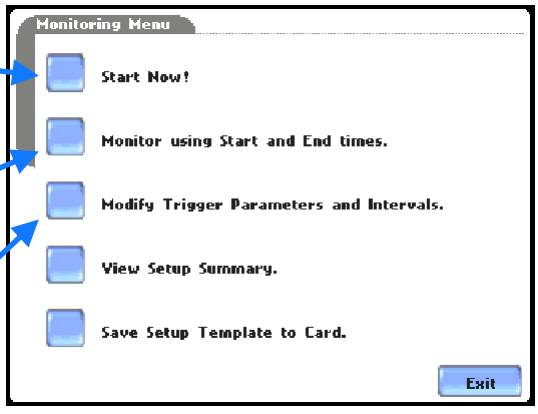
Automatic Setup

- *Press: Start Now!* to start an "open-ended" monitoring session and return to the Home Screen
- *Press: Monitor using Start and End times* to schedule a defined monitoring period
- Shortcut to modify trigger parameters (covered in wizard setup)



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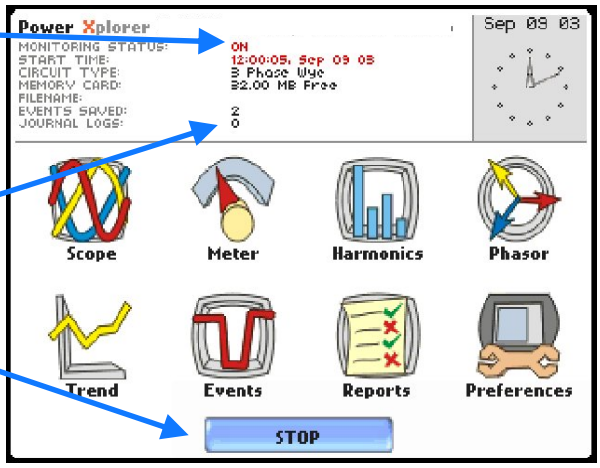
Automatic Setup: Monitoring On

- While the instrument is actively monitoring data, the message MONITORING STATUS: ON appears on the top section of the Home screen
- Events and Journal log entries are enumerated on status screen as they occur
- *Press: Stop* to halt a monitoring session



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Default parameter settings by mode

Parameters	Standard Power Quality	Current Inrush	Fault Recorder	Long-term Timed Recording	Continuous Data Logging	EN50160
RMS Variation						
High Limit	110%	120%	110%	Off	Off	110%
Low Limit	90%	Off	90%	Off	Off	90%
Very Low Limit	10%	Off	10%	Off	Off	1%
RMS Pre-trigger (cycles)	6	4	4	0	1	6
RMS In-Out Post-trigger (cycles)	6	200	100	10 (50 Hz); 12 (60 Hz)	2	6
RMS Out-In Post-trigger (cycles)	6	200	1000	10 (50 Hz); 12 (60 Hz)	2	6
Waveform Capture Pre-trigger (cycles)	2	4	4	0	1	2
Waveform Capture Post-trigger (cycles)	2	200	1000	10 (50 Hz); 12 (60 Hz)	2	2

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Default parameter settings by mode, continued

Parameters	Standard Power Quality	Current Inrush	Fault Recorder	Long-term Timed Recording	Continuous Data Logging	EN50160
Transients						
Absolute Instantaneous Peak	170%	350%	170%	Off	Off	170%
High Frequency	100%	Off	100%	Off	Off	100%
Cycle-by-cycle Waveshape Magnitude	10%	Off	10%	Off	Off	10%
Cycle-by-cycle Waveshape Duration (% of cycle)	10%	Off	10%	Off	Off	10%
Waveform Duration	7%	Off	7%	Off	Off	7%

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Default parameter settings by mode, continued

Parameters	Standard Power Quality	Current Inrush	Fault Recorder	Long-term Timed Recording	Continuous Data Logging	EN50160
Waveform Capture Trigger Response						
When Volts go out, record:	All Active Channels	Off	All Active Volt Channels	Off	Off	All Active Channels
When Amps go out, record:	Fault Amps Channels	Fault Amps Channels	Fault Amps Channels	Off	Off	Fault Amps Channels
Journal Intervals						
Volts	10 minutes	Off	Off	10 minutes	1 second	10 minutes
Amps	10 minutes	Off	Off	10 minutes	1 second	10 minutes
Power	10 minutes	Off	Off	10 minutes	1 second	10 minutes
Demand	15 minutes	Off	Off	15 minutes	Off	15 minutes
Energy	10 minutes	Off	Off	10 minutes	Off	10 minutes
Harmonics	10 minutes	Off	Off	10 minutes	Off	10 minutes
Flicker (Pst)	10 minutes	Off	Off	10 minutes	Off	10 minutes
Flicker (Plt)	2 hours	Off	Off	2 hours	Off	2 hours
Characterizer Mode	IEEE 1159	None	None	IEEE 1159	None	IEC 61000-4-30

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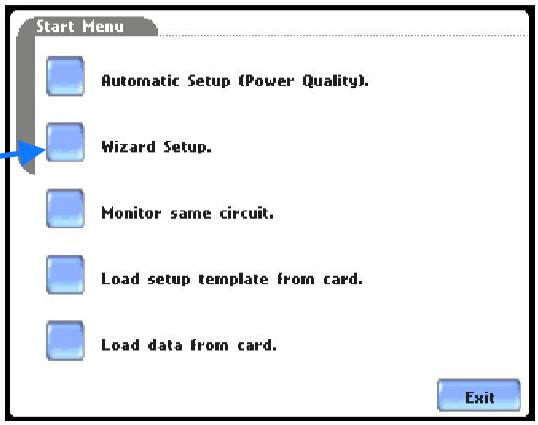
Wizard Setup

- From the Start Menu, *Press: Wizard Setup*



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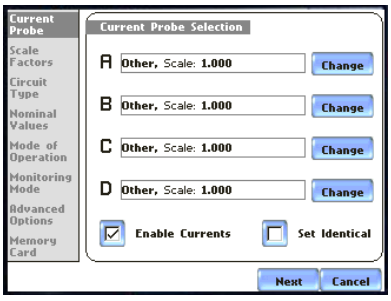
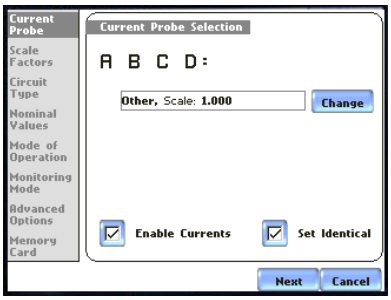
Wizard Setup: Current Probe Selection

- If current will *not* be monitored, *press (to deselect) Enable Currents*
- If current *will* be monitored, *press Change* to choose the probe for each channel
- *Press Set Identical* if using identical probes for all channels
- If your current probe is not on the list, select *Other*
- *Press Next* when finished





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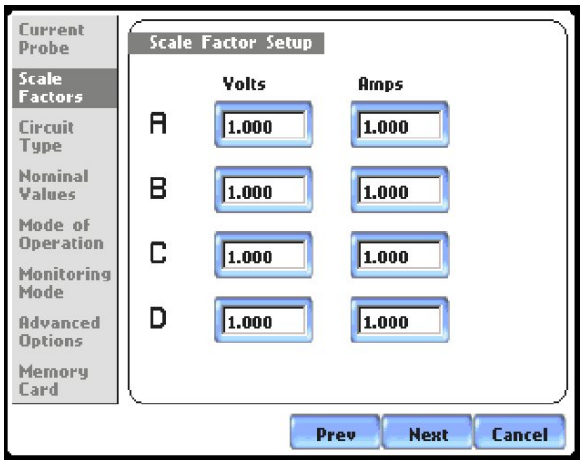
Wizard Setup: Scale Factors

- Enter a scale factor if appropriate:
  - **Probe not on menu (choose other),**
  - **Measuring on the output of a potential transformer or current transformer**
  - **Using a Dranetz-BMI ISO box**
- Scale factors are calculated by dividing the output into the input (e.g. 1000:200 is 1000/200 =5)
- Press *Next* when finished



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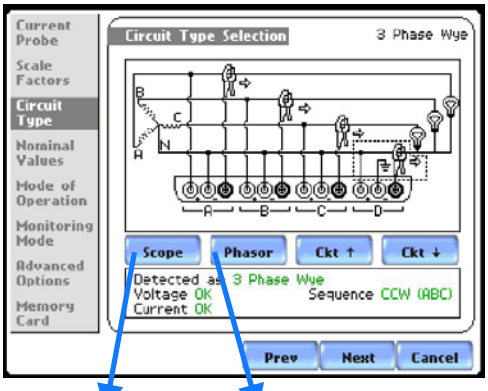
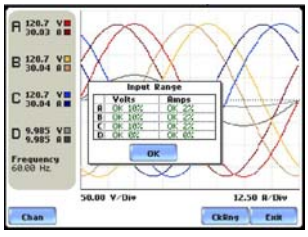
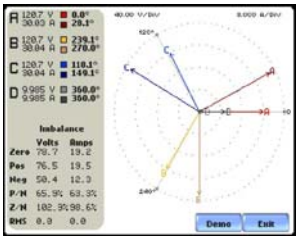
Wizard Setup: Circuit Type

- *Press: Ckt* buttons to cycle through available circuit types
- Autodetected circuit appears in green type
- *Press: Scope* or *Phasor* to verify correct circuit and wiring
- *Press Next* when finished







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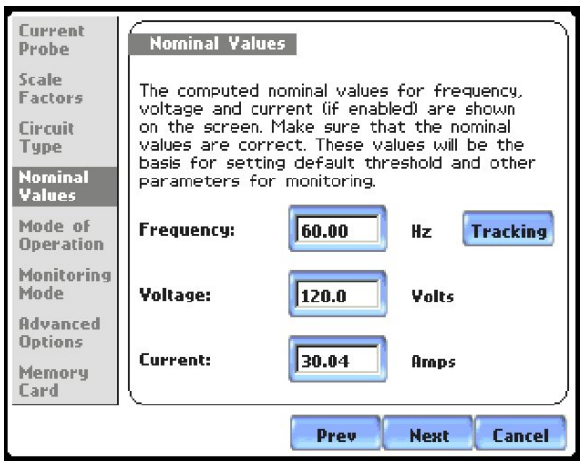
Wizard Setup: Nominal Values

- Verify/correct the nominal values which are used to set default thresholds
- *Press Tracking* for frequency tracking options
- Nominal frequency should match your line frequency
- Nominal Current is whatever is detected on circuit. Set to your spec
- *Press Next* when finished



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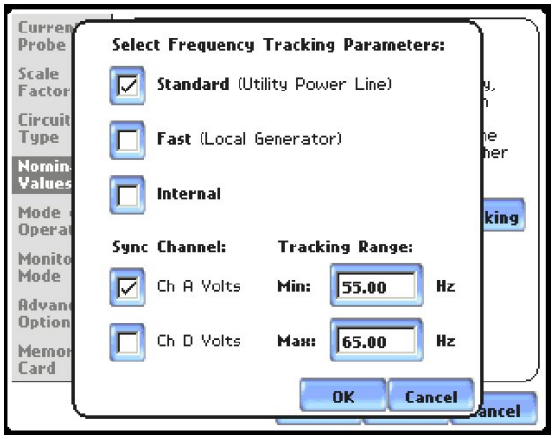
Frequency Tracking

- ***Standard*** **(16-440 Hz.) "rides through" voltage changes & tracks the fundamental frequency even in the absence of voltage**
- ***Fast*** **(16-65 Hz.) follows frequency changes more closely**
- ***Internal*** **uses the nominal frequency when making measurements where no ref. signal (e.g. DC) is available**
- **Specify the channel used for external sync (A or D) and the tracking range**
- ***Press OK*** **when finished**
- ***Press Next*** **when finished**



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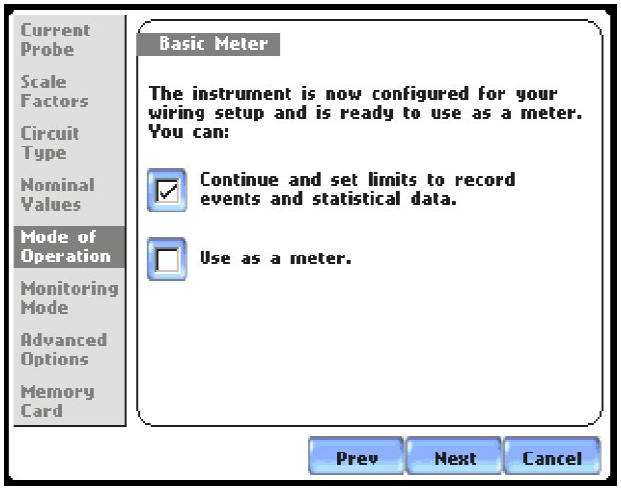
Wizard Setup: Mode of Operation

- To record data, *press: Continue and set limits...*
- then *Press: Next*
- (Cancel discards changes and returns to Start menu)



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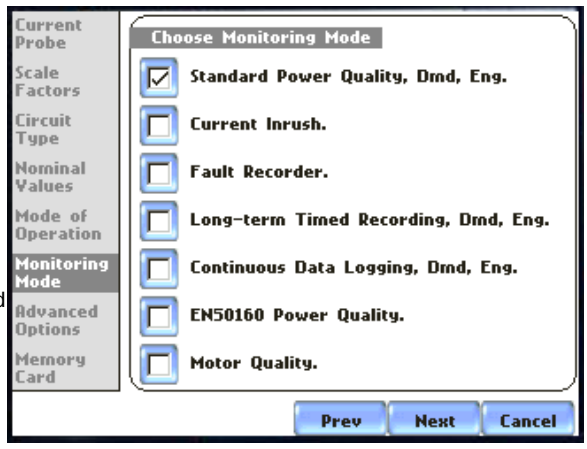
Wizard Setup: Monitoring Mode

- *Gives you a choice of templates for parameter thresholds setup:*
  - ***Standard Power Quality, Demand, Energy*** (default) optimizes the instrument to collect data for troubleshooting using standard power quality parameters, with numerous trigger conditions set (used by smart start/autoconfig)
  - ***Current Inrush*** is ideal for recording motor start-up and inrush conditions. It triggers on change in current with longer cycle-by-cycle waveform capture than Standard Power Quality
  - ***Fault Recorder*** is similar to Inrush but with a voltage trigger



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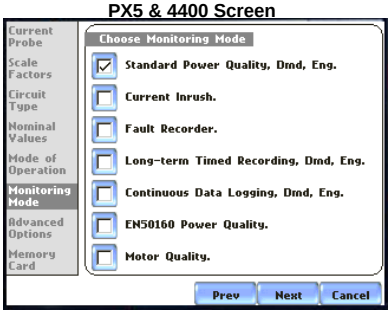
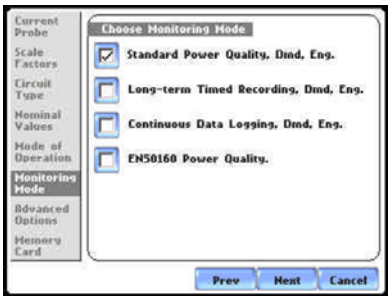
Wizard Setup: Monitoring Mode, cont.

- *...templates continued:*
  - ***Long-term Timed Recording, Demand, Energy*** uses periodic measurements only (no triggers, only trended values are available)
  - ***Continuous Data Logging, Demand, Energy*** logs rms and power values once per second until memory is filled or for specified time period
  - ***EN50160 Power Quality*** monitors and reports Quality of Supply (QOS) compliance as specified by the EN50160 standard
- *Press: Standard Power Quality, Demand, Energy*
- *Press: Next*

PX5 & 4400 Screen



PowerVisa 440 Screen



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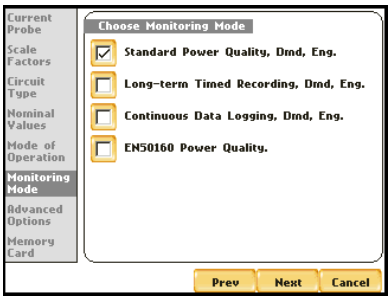
Wizard Setup: Monitoring Mode / PV 440

- *The PowerVisa has 4 templates for parameter thresholds setup:*
  - ***Standard Power Quality, Demand, Energy*** (default) optimizes the instrument to collect data for troubleshooting using standard power quality parameters, with numerous trigger conditions set (used by smart start/autoconfig)
  - ***Long-term Timed Recording, Demand, Energy*** uses periodic measurements only (no triggers, only trended values are available)
  - ***Continuous Data Logging, Demand, Energy*** logs rms and power values once per second until memory is filled or for specified time period
  - ***EN50160 Power Quality*** monitors and reports Quality of Supply (QOS) compliance as specified by the EN50160 standard



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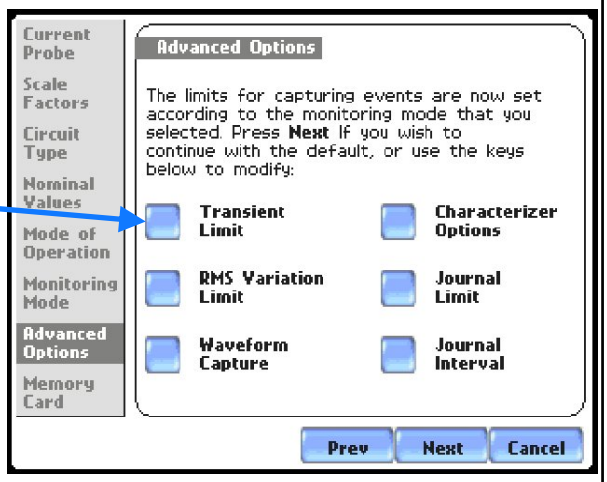
Wizard Setup: Advanced Options

- The unit is now ready to begin monitoring and to record data in the memory card
- *Press: Next* to accept defaults, or *press* to modify:
- Transient Limit
- RMS Variation Limit
- Waveform Capture
- Characterizer options
- Journal Limit
- Journal Interval



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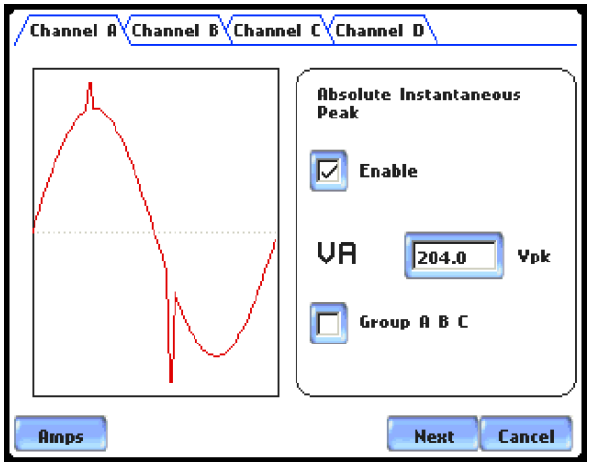
Wizard Setup: Transient Limits-Instantaneous Peak

- From the Advanced options screen, *Press: Transient Limit*
- If applicable, *Press: Group A B C* to simplify setup
- *Press the limit field* and enter the instantaneous limit. ***This value is compared against the absolute value of each of 256 samples of the V and I channel waveforms***
- Vpk must be set higher than the peak of the normal waveform (1.414 x the rms value) or continuous triggering will result
- *Press: Enable*
- *Press Amps* to toggle between volts and amps
- *Press the other tabs* to set other channels
- *Press: Next* to continue



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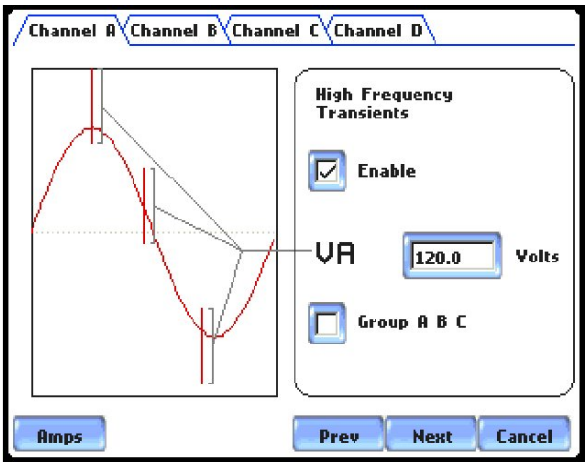
Wizard Setup: PX5 Transient Limits-Hi Frequency Detectors*

- The PX5's high frequency card allows it to capture high-frequency transients (>2µSec)
- If applicable, *Press: Group A B C* to simplify setup
- *Press the limit field* and enter the limit.
- *Press: Enable*
- *Press Amps* to toggle between volts and amps
- *Press the other tabs* to set other channels
- *Press: Next* to continue



- * only available on
- PowerXplorer PX5

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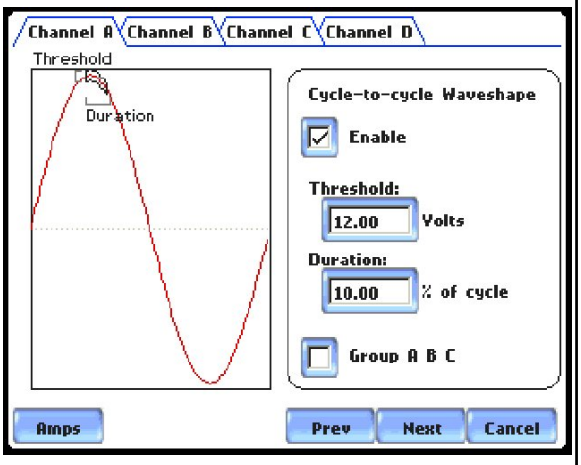
Wizard Setup: Transient Limits-Waveshape Fault Detection

- *Press* limit field under *Threshold* to change limit
- ***If the wave samples differ by more than the threshold tolerance for a time exceeding the Duration or window percent of power frequency cycle, a waveshape fault is registered.***
- Useful for capturing low-mid frequency transients
- *Press* limit field under *Duration* to change limit
- *Press: Enable*
- *Press Amps* to toggle between volts and amps
- *Press the other tabs* to set other channels
- *Press: Next* to continue



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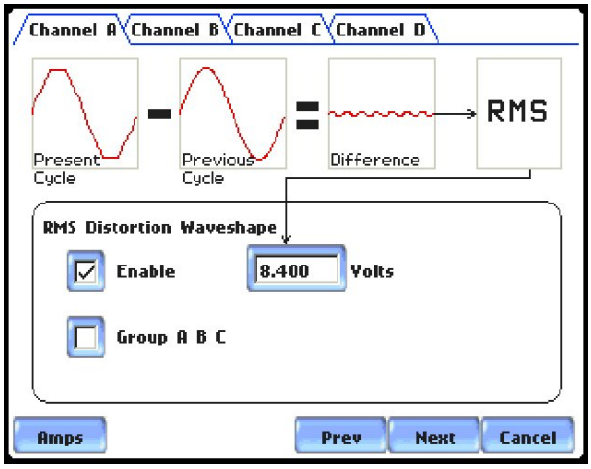
Wizard Setup: Transient Limits-RMS Distortion Waveshape

- *Press* limit field under *Volts or Amps* to change limit
- ***This sets the threshold limit beyond which rms voltage/current variations occur***
- Similar to previous screen with window set at 100%
- *Press: Enable*
- *Press Amps* to toggle between volts and amps
- *Press the other tabs* to set other channels
- *Press: Next* to continue



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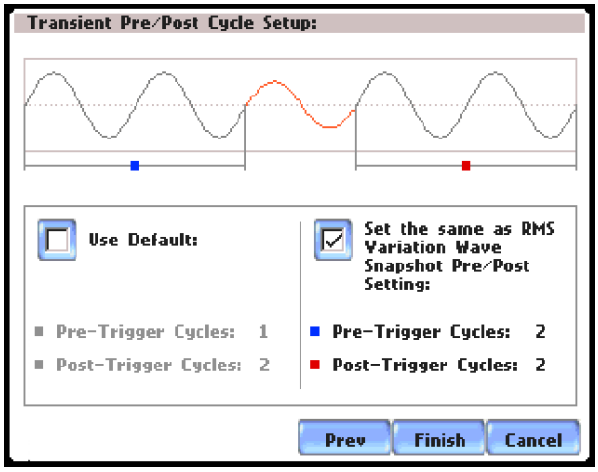
Wizard Setup: Transient Limits-Pre/Post Cycle capture

- *Press* limit field under *Volts or Amps* to change limit
- ***This chooses the number of cycles before and after the trigger cycle to capture***
- *Press: Use Default* to capture Pre: 1, Post: 2
- *Press: Set same as RMS variation* to capture Pre: 2, Post: 2
- *Press: Finish* to complete Transient Limit setup and return to will return to the Advanced Options menu



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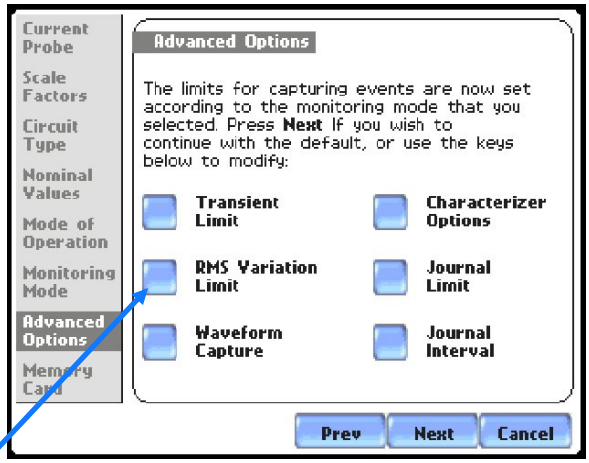
Wizard Setup: RMS Variation Limits

- RMS triggers occur when any one of the measured quantities crosses the high or low limit for a period of at least one rms sample point (which are taken twice per cycle with a one cycle sliding integration window)
- Disturbance End = the cycle when all triggered channels return within limits for a minimum duration of cycles specified in *range to end* event. Until then, any subsequent excursions beyond the thresholds are considered part of the original disturbance. To minimize the number of triggers recorded for a sequence of closely spaced disturbances, hysteresis is employed in both voltage and time for the begin-event and end-event thresholds
- ***Press: RMS Variation Limit***



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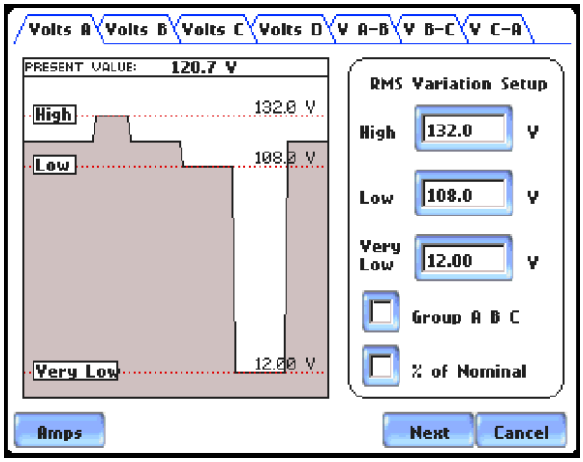
Wizard Setup: RMS Variation Limits

- If applicable, *Press: Group A B C* to simplify setup
- Press the threshold parameter *(High, Low, Very Low)* to change, enable or disable threshold values
- High limits must be at least .1 higher than Low limits, or the entered value will not be accepted.
- *Press: % of Nominal* to use percentages instead of volts
- *Press the other tabs* to set other channels
- *Press: Amps*



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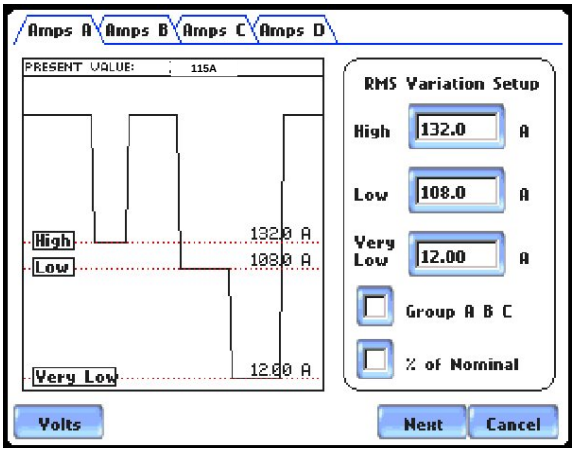
Wizard Setup: RMS Variation Limits

- If applicable, *Press: Group A B C* to simplify setup
- Press the threshold parameter *(High, Low, Very Low)* to change, enable or disable threshold values
- High limits must be at least .1 higher than Low limits, or the entered value will not be accepted.
- *Press: % of Nominal* to use percentages instead of amps
- *Press the other tabs* to set other channels
- *Press: Next*



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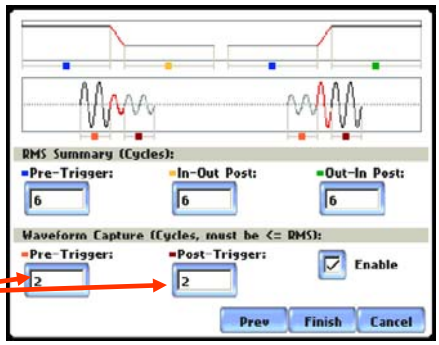
Wizard Setup: RMS Variation & Waveform Capture

- Choose the number of cycles of RMS samples to record for **RMS Summaries**
- Choose the number of cycles waveforms to capture for **Waveform Capture** summaries—recommend making value same as RMS Summary cycles above.
- These are two *separate* captures stored into the database
- Enable/Disable Waveform Capture
- *Press: Finish* to return to the advance options screen



Note: **PX5 & 4400 have 10,000-cycles post-trigger capture. PowerVisa 440 is limited to 100-cycles post-trigger.**

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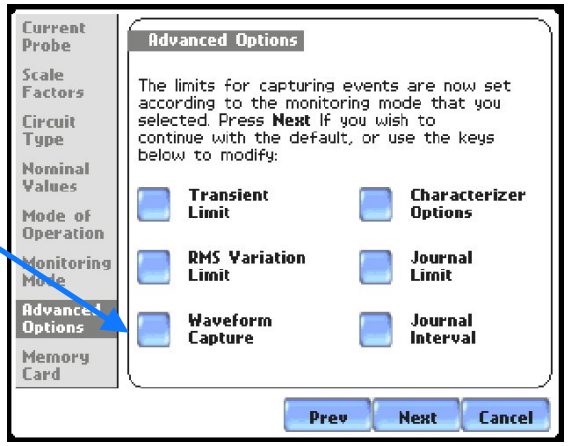
Wizard Setup: Waveform Capture (cross triggering)

- Waveform captures may be associated with voltage and current triggers
- *Press: Waveform Capture*



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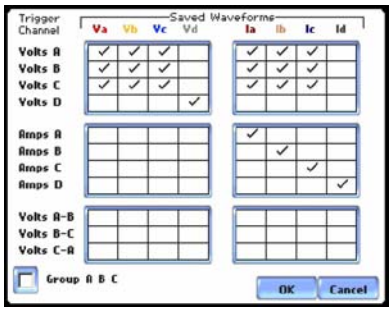
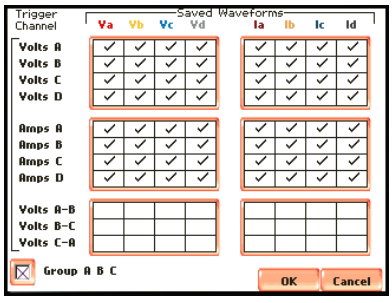
Wizard Setup: Waveform Capture (cross triggering)

- The trigger channels are in the left column and the grid rows that are checked show which channels will have waveforms captured
- *Press: Group ABC* if applicable
- *Press: any of the grids* to change the capture configuration





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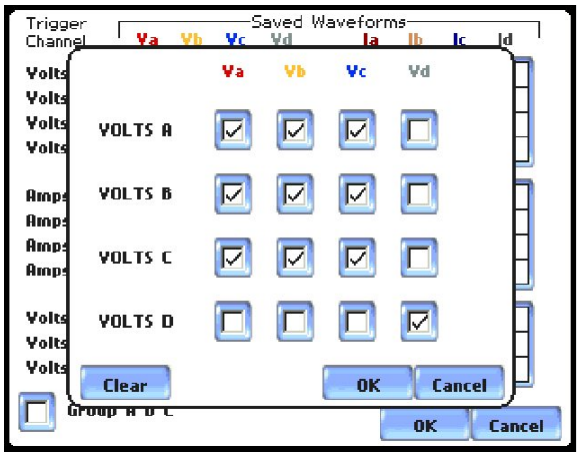
Wizard Setup: Waveform Capture (cross triggering)

- Select the channels to capture waveforms when triggered by the left column parameter
- *Press: Clear* to remove previous selections
- *Press: OK* when finished
- *Press: OK* again when finished with all the cross trigger grids to return to the Advanced Monitoring Screen



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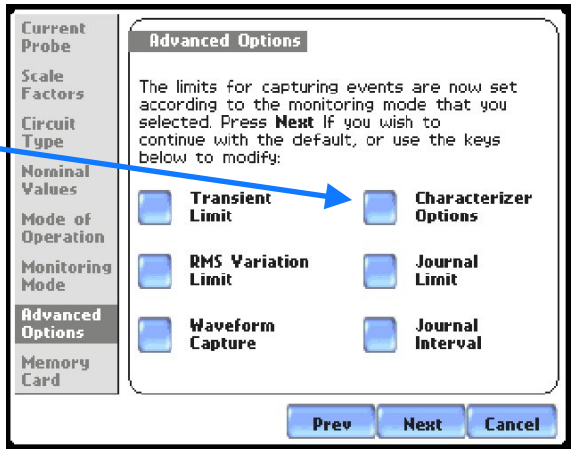
Wizard Setup: Characterizer Options

- Characterizer options selects how the PX5 categorizes triggered events
- *Press: Characterizer Options*



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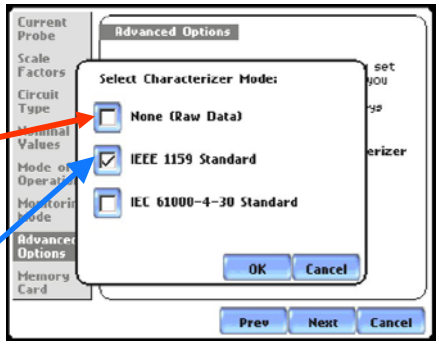
Wizard Setup: Characterizer Options

- Event data is measured in compliance with the criteria set by IEEE 1159 or IEC 61000-4-30 Class A
- *Press: None* (Raw Data) if you do not want to characterize event data according to any measurement standard—uses less CPU time.
- *Press: IEEE 1159 Standard (typical for North America)* or *IEC 61000-4-30 Standard* to characterize event data
- *Press: OK* to accept changes in characterizer setting and return to Advanced Options menu



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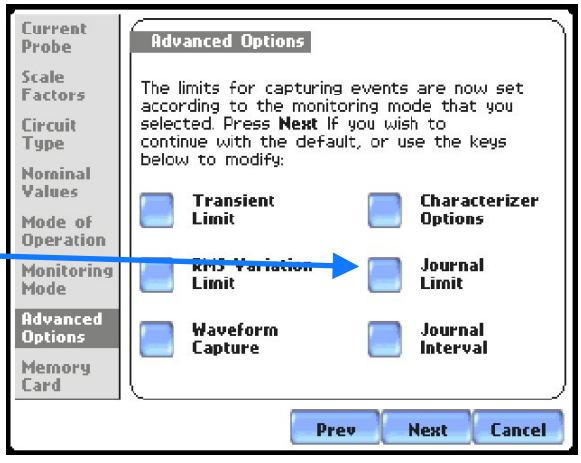
Wizard Setup: Journal Limit

- Periodic readings of power parameters are stored as trend data in a journal
- Statistical info is captured regardless of limit settings, even when no disturbances occur
- *Press: Journal Limit*



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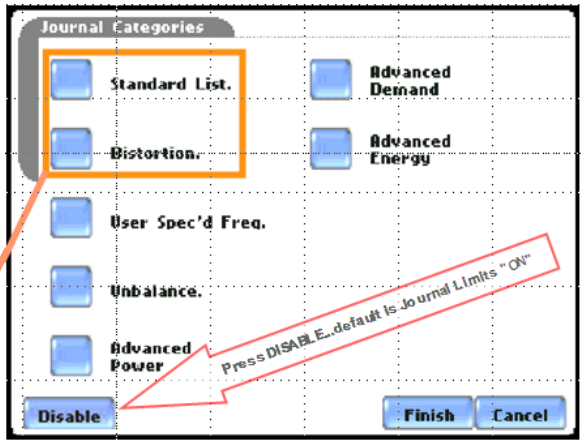
Wizard Setup: Journal Limit

- Journal categories are templates of journal settings for various applications
- A complete list is available in chapter 6 of the manual
- *Press: Standard List*
- *Only Standard List and Distortion are available on the **PowerGuide 4400** & **PowerVisa 440***



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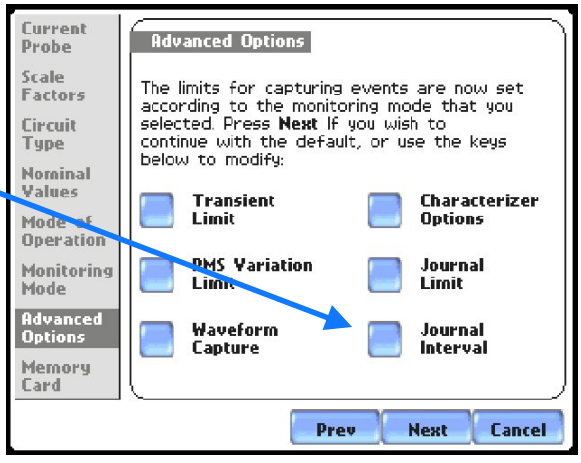
Wizard Setup: Journal Interval

- Defines how often the PX5 saves data periodically, regardless of power quality disturbances and journal limits
- *Press: Journal Interval*



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Wizard Setup: Journal Interval

- Press a category, then press repeatedly the parameter that you want to change to display the available selection values

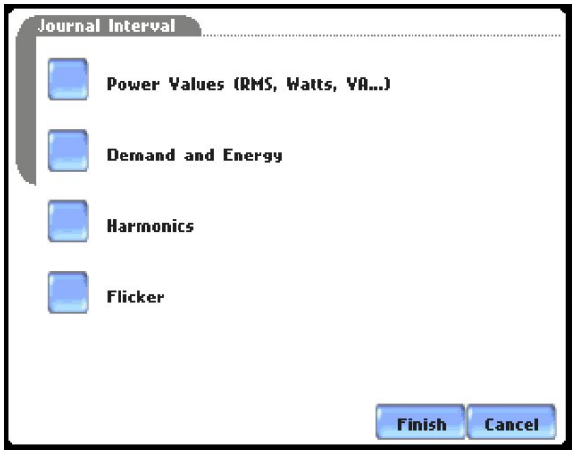
- Power Values: Interval (seconds): OFF, 1, 60, 120, 300, 600, 900, 3600
- Waveform Snapshot: OFF, ON

- Demand and Energy: Demand Sub-Interval (minutes): OFF, 3, 5, 10
- Sub-Intervals per Interval (minutes): OFF, 1, 2, 3, 4, 5, 6

- Harmonics: (minutes): OFF, 1, 2, 5, 10, 15, 60

- Flicker: Pst (Short Term) Interval (minutes): OFF, 1, 2, 5, 10, 15, 30 Plt (Long Term) Interval (hours): OFF, 1, 2, 3, 4, 8

- Press: Finish to return to Advanced Options



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Wizard Setup: Journal Interval—Power Value…

- Power Values: Interval (seconds): OFF, 1, 60, 120, 300, 600, 900, 3600

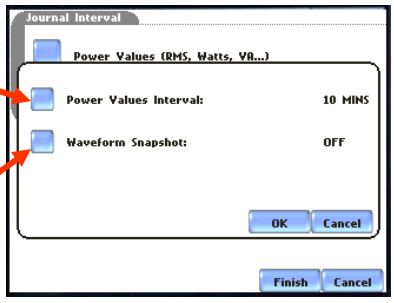
  [Press a category, then press repeatedly the parameter that you want to change to display the available selection values.]

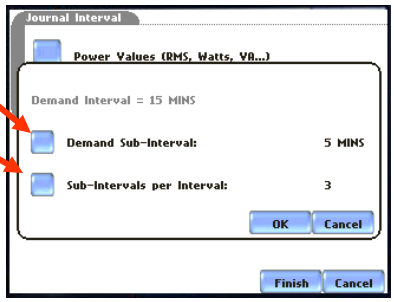
- Waveform Snapshot: OFF, ON

- Demand and Energy: Demand Sub-Interval (minutes): OFF, 3, 5, 10

- Sub-Intervals per Interval (minutes): OFF, 1, 2, 3, 4, 5, 6

  [Press a category, then press repeatedly the parameter that you want to change to display the available selection values.]





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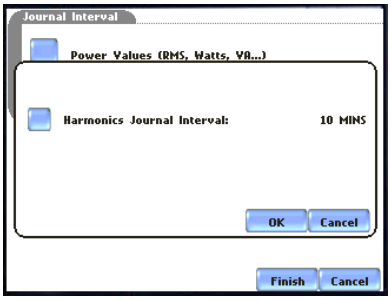
Wizard Setup: Journal Interval—Harmonics & Flicker

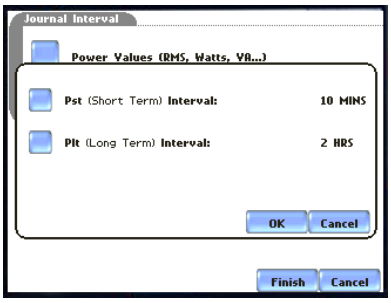
•Harmonics: (minutes): OFF, 1, 2, 5, 10, 15, 60

[Press a category, then press repeatedly the parameter that you want to change to display the available selection values.]



•Flicker: Pst (Short Term) Interval (minutes): OFF, 1, 2, 5, 10, 15, 30 Plt (Long Term) Interval (hours): OFF, 1, 2, 3, 4, 8

[Press a category, then press repeatedly the parameter that you want to change to display the available selection values.]



•Press: Finish to return to Advanced Options

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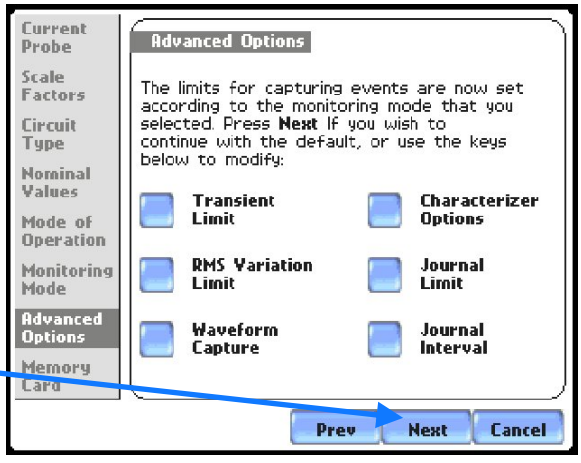
Wizard Setup: Memory Card

•The last item in Step-by-step setup is saving your new setup on the memory card*

•Note: You can save & load setups on a card reserved for that purpose, then swap to another card for monitoring w/o powering down

•*Press: Next*



If you do not manually save your setup to memory card and do not start monitoring with your setup in place, then your setup will not be saved (as last setup used) on power down, and will be lost!

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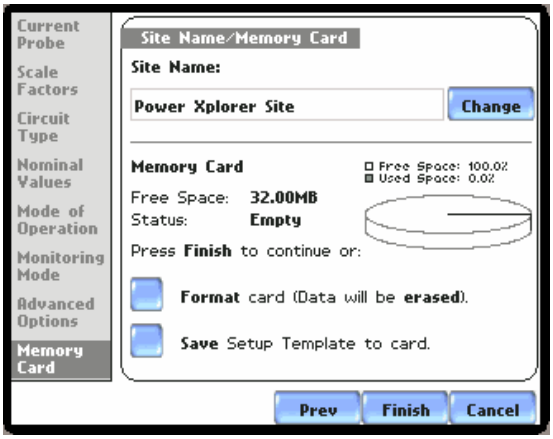
Wizard Setup: Memory Card Facts

- **Setups templates are saved as *filename.SET***
- **Event data is saved as *filename_xx.DDB***
- **Maximum length for site/filenames is 32 characters. following DOS conventions**
- ***Cards must be formatted in the 4400 or PX5 before use***
- ***You cannot delete files on the 4400 or PX5***
- ***If you delete files on a CF card on a PC and then insert it into the 4400 or PX5, it will display 'fragmented' on the status line. The card must then be formatted in the 4400 / PX5 before use***



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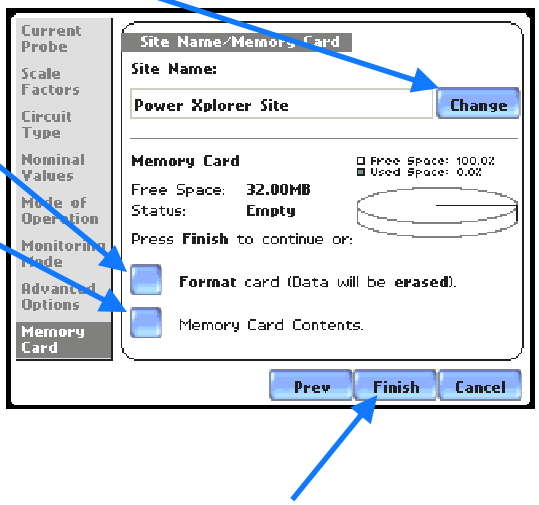
Wizard Setup: Memory Card

- *Press: Change* to give your setup a unique Site Name
- (also used to name captured data)
- *Format* the card if necessary *(strongly recommended)*
- *Press: Memory Card Contents to see what's on the card now*
- *Press: Finish* to exit to the Monitoring Menu



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Wizard Setup: Finish, Begin Monitoring

- *Press: Start Now!* to start an"open-ended" monitoring session and return to the Home Screen
- *Press: Monitor using Start and End times* to schedule a defined monitoring period
- *Press: Save Setup Template to Card* to save a copy of the current setup on the memory card *(recommended)*

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***** 4400/PX5 Pre-Monitoring Checklist *****

- CF Card inserted and formatted?
- Correct Date and Time settings?
- Appropriate settings file loaded or new setting file saved?
- Actual circuit connection matches monitor suggested hookup?
- Correct current probes, scale factors, nominal voltage and current?
- Phasor screen indicates correct hookup & circuit probe orientation?
- (Optional) Journal Limits (Standard List: Basic and Harmonics) disabled?
- Reports->Status->Annunciator screen all green (Are your thresholds too tight)?

- ***Start Monitoring!***

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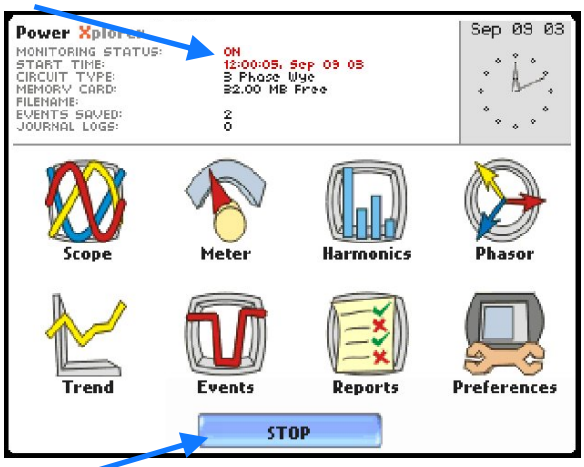
Monitoring On

- While the instrument is actively monitoring data, the message MONITORING STATUS: ON appears on the top section of the Home screen
- Event data is saved as filename_xx.DDB, where xx is a number (00-99) incremented each time a monitoring session uses the same filename on the card
- You may continue to monitor real-time data during monitoring
- *Press: Stop* to halt a monitoring session



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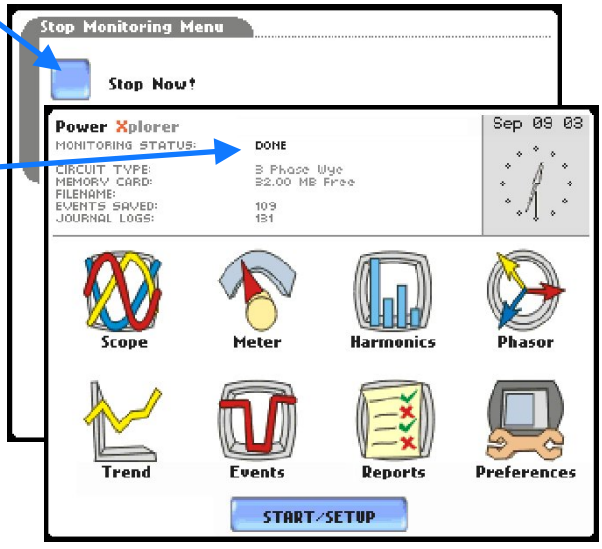
Stopping Monitoring

- *Press: Stop Now!* to halt a monitoring session
- When monitoring ends, the message MONITORING STATUS: DONE appears on screen
- If you wish to continue a monitoring session on another card, stop monitoring, power down, change cards (format if necessary) and select: *monitor same circuit*



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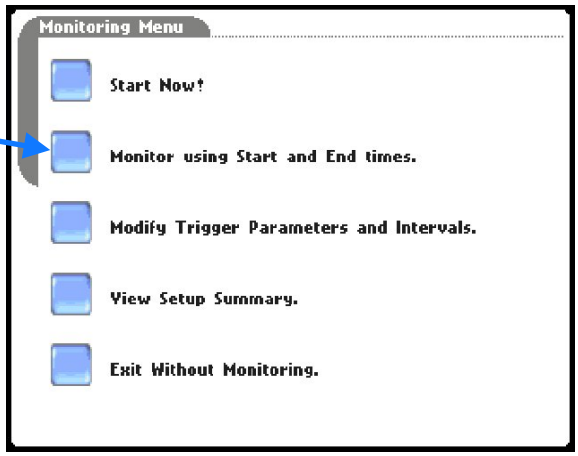
Monitoring using Start and End Times

- *Press: Monitor using Start and End times* to schedule a defined monitoring period



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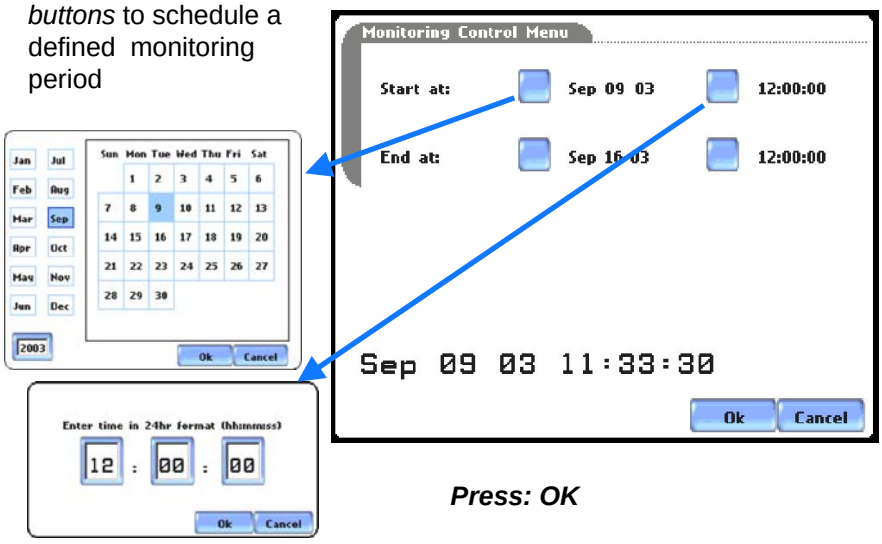
Monitoring using Start and End Times

- *Press: Date and Time buttons* to schedule a defined monitoring period



Press: OK

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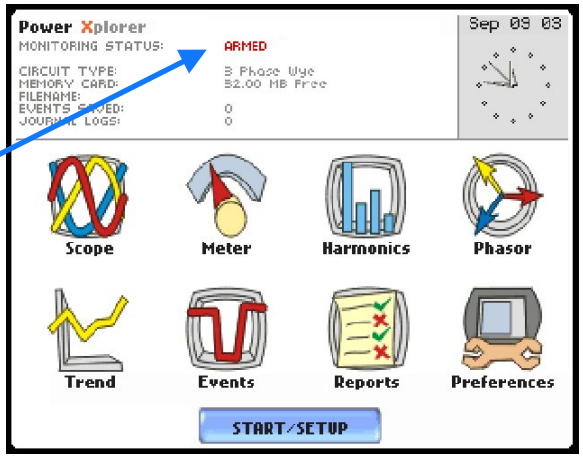
Monitoring using Start and End Times

- After specifying the Start and End time/date of monitoring, the message MONITORING STATUS: ARMED appears on screen
- Monitoring will start & stop at the specified time and dates
- Monitoring can be stopped early by *pressing: STOP*



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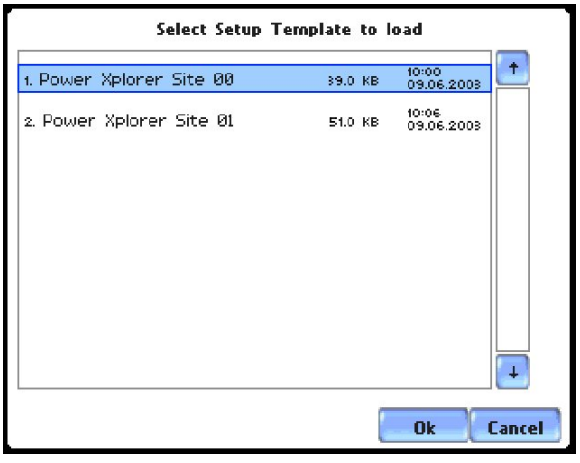
Loading a Setup from Memory Card

- ***Note: Loading a setup template from the card will overwrite your existing setup!***
- From the Start Menu, *press: Load setup template from card*
- Setup template files (.set) on memory card are displayed ordered by date and time of creation
- *Press* to select (highlight) the *desired setup template file*
- *Press: OK* to load setup
- Start Monitoring with setup



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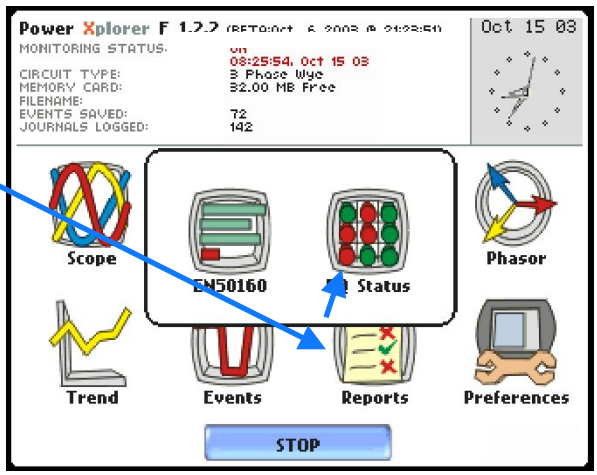
Checking the Annunciator Panel

- After starting a monitoring session, press the Reports icon and then the Status icon to display the Summary report via the Annunciator panel



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The Annunciator Panel

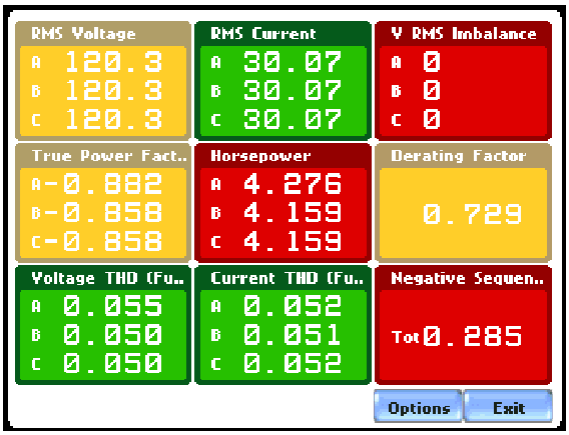
- Green indicates no events have occurred in that category since start of monitoring period or last time clear button was pressed

- Any other color indicates that thresholds are being passed. You may have set your thresholds too tightly and you may be filling memory rapidly

- *Press: Clear* to restart event counters

- Hint: *This is a good screen to leave the unit on while monitoring, for instant status updates*

- *Press: any parameter* or options to view or change annunciator details



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Workbook Modules:

1 Hardware and Basic Operation

2 Real-Time Monitoring

3 Long-Term Monitoring

4 Viewing Data on the 440 / 4400 / PX5

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Viewing Data on the 4400 / PX5:

- Viewing Events
- Viewing Trends
- Viewing Reports

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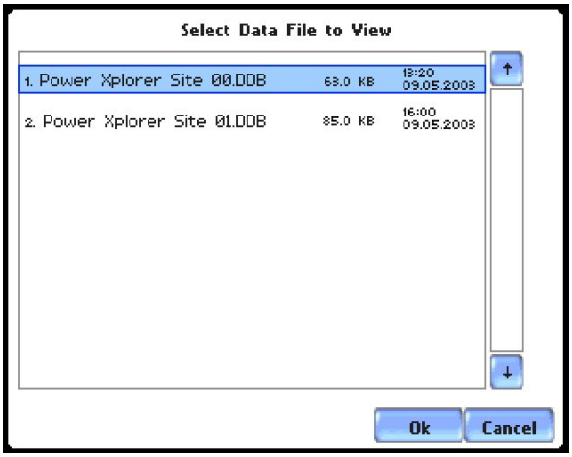
Loading Event Data from Memory Card

- You must load event data or be currently monitoring to view events
- To load event data:
- From the Start Menu, *press:* Load data from card
- Files on memory card are displayed ordered by date and time of creation
- Press the desired event file to highlight it
- *Press:* OK


Select Data File to View
1. Power Xplorer Site 00.DDB 68.0 KB 18:20 09.05.2008
2. Power Xplorer Site 01.DDB 85.0 KB 16:00 09.05.2008
Ok
Cancel

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Viewing Event Data

- **Events**
  - Recorded when a programmed threshold is crossed
  - Contain pre-trigger, trigger (fault), and post-trigger cycle(s)
  - May also contain other channel info depending on setup
  - Event Data is available *during and after monitoring*

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Viewing Trend Data

- **Trends**
  - –A graph of parameters and channels over time
  - –Shows a macro view interface of timespan, trigger conditions, and channels of data that were recorded
  - –Only Standard and Distortion trends are available on the PowerGuide 4400

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Viewing Reports

- **Reports**
  - PQ Status summary for Quality of Supply (QOS) using the annunciator panel, indicating whether parameter is within limits and/or events have occured since the last time the panel was cleared
  - Status monitors QOS compliance on a continuous basis
  - EN50160: displays a one-week interval to produce a PASS/FAIL decision (95%) of compliance

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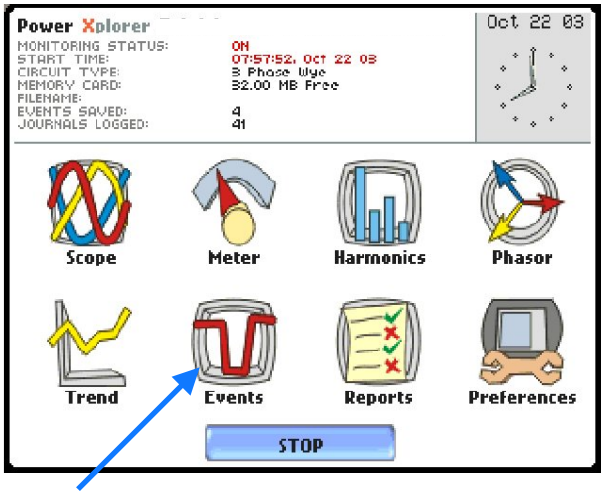
Viewing Events

- *Press: Events* to view event list, graphs and waveform/RMS plots



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Event Classifications: Short Duration

	IEEE 1159	IEC 61000-4-30 (deviations from IEEE 1159 only are noted)	Dranetz-BMI
Short Duration Variations			
Magnitudes			
Sag/Dip	(Sag) Vrms Below 90% (or Low limit) to 10% of nominal	(Dip) Vrms Below 90% (or Low limit) of nominal	
Swell	Vrms Above 110% (or High limit) to 180% of nominal	Vrms Above 110% (or High limit) of nominal	
Interruption	Vrms Below 10% (or Very Low limit) of nominal	Vrms Below 1% (or Very Low limit) of nominal	
Temporal			
Instantaneous	0.5 - 30 cycles		
Momentary	0.5 - 30 seconds		
Temporary	3 - 60 seconds		
Duration	begins when any one phase is Out of Limits; ends when all phases are Within Limits		

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Event Classifications: Long Duration

	IEEE 1159	IEC 61000-4-30 (deviations from IEEE 1159 only are noted)	Dranetz-BMI
Long Duration Variations			
Magnitudes Sag Swell Interruption	same magnitude values as Short Duration Variations (see above)		
Duration Sustained Cold Load Pickup is return from sustained	> 1 minute		

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Event Classifications: Transient

	IEEE 1159	IEC 61000-4-30 (deviations from IEEE 1159 only are noted)	Dranetz-BMI
Transients			
Impulsive Oscillatory High Frequency frequency range duration magnitude Medium Frequency frequency range duration magnitude Low Frequency frequency range duration magnitude	no more than one transition in each direction ringing freq following initial transition 0.5 - 5 MHz 5 us 0 - 4 pu above Vnom 5 - 500 KHz 20 us 0 - 8 pu above Vnom 1/2 cycle - 5 KHz 0.3 - 50 ms 0 - 4 pu above Vnom	IEC classification for transients are undefined, as of version approved in 2003.	Peak - absolute value from zero axis Width - time between 50% of peak rise and fall Duration - total time of waveshape trigger Rise - time between 10% and 90% of peak Fall - time between 90% and 10% of peak Direction: Positive - adds energy to curve; Negative - subtracts energy from curve Ring frequency - dominant between 2nd and 128th harmonic

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Event Classifications: Waveform Distortion

	IEEE 1159	IEC 61000-4-30 (deviations from IEEE 1159 only are noted)	Dranetz-BMI
Waveform Distortion (measured as steady state values from 10/12 cycle calculations)			
DC Offset			
frequency range			
magnitude	0 - 0.1%		
Harmonics			
frequency range	DC - 100th		
magnitude	0 - 20%		
Interharmonics			
frequency range	0 - 6 KHz		
magnitude	0 - 2%		
Notching			
frequency range	35 KHz		
magnitude			
Noise			
frequency range	Broadband		
magnitude	0 - 1%		

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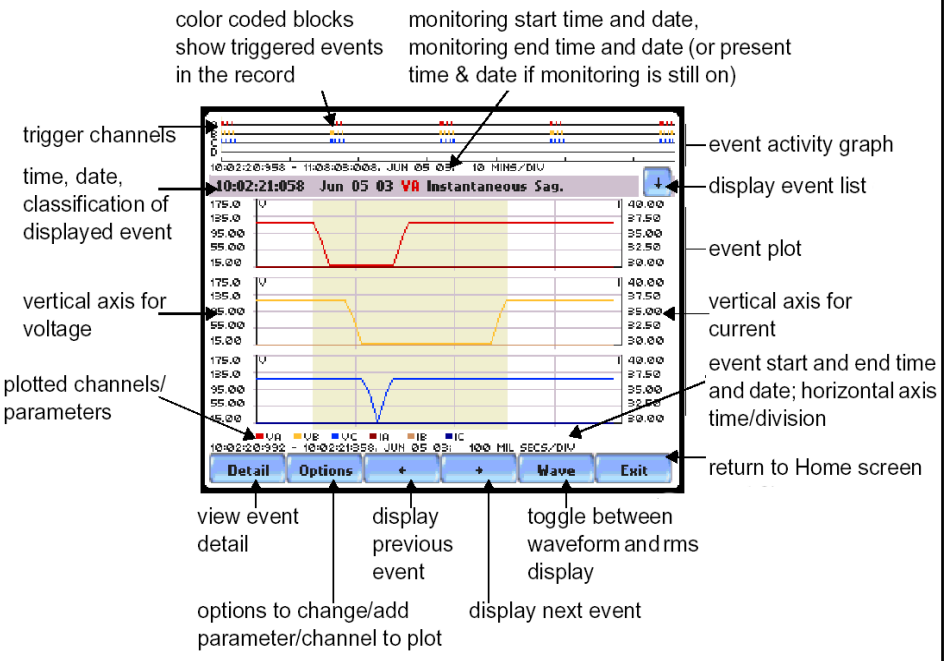
Viewing Events: Screen Layout


color coded blocks show triggered events in the record
monitoring start time and date, monitoring end time and date (or present time & date if monitoring is still on)
trigger channels
time, date, classification of displayed event
vertical axis for voltage
plotted channels/ parameters
event activity graph
display event list
event plot
vertical axis for current
event start and end time and date; horizontal axis time/division
return to Home screen
10:02:21:058 Jun 05 03 VA Instantaneous Sag.
Detail
Options
Wave
Exit
view event detail
display previous event
toggle between waveform and rms display
options to change/add parameter/channel to plot
display next event

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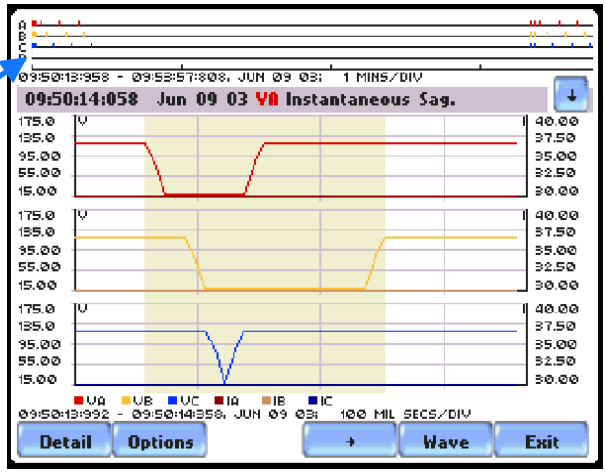
Viewing Events: Event Activity Graph

- The event graph is located on the top section of the event screen
- Four timelines represent all events recorded from the time monitoring started
- Voltage events are displayed above the grid and current channels below


09:50:13:958 - 09:53:57:808, JUN 09 03: 1 MINS/DIV
09:50:14:058 Jun 09 03 VA Instantaneous Sag.
VA VB VC IA IB IC
09:50:13:992 - 09:50:14:358, JUN 09 03: 100 MIL SECS/DIV
Detail
Options
Wave
Exit

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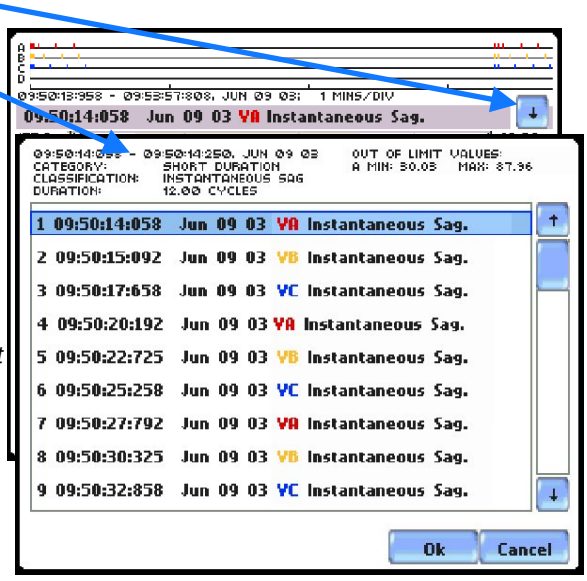
Viewing Events: Event Selection

- *Press: Down arrow button* to view event list screen
- The top section of the Event List displays a summary of the highlighted event
- *Press: arrows* or drag the scroll bar to scroll the list up and down
- *Press: the desired event* to highlight it
- *Press: OK*


09:50:13:958 - 09:53:57:808, JUN 09 03: 1 MINS/DIV
09:50:14:058 Jun 09 03 VA Instantaneous Sag.
CATEGORY: SHORT DURATION
CLASSIFICATION: INSTANTANEOUS SAG
DURATION: 12.00 CYCLES
OUT OF LIMIT VALUES:
1 09:50:14:058 Jun 09 03 VA Instantaneous Sag.
2 09:50:15:092 Jun 09 03 VB Instantaneous Sag.
3 09:50:17:658 Jun 09 03 VC Instantaneous Sag.
4 09:50:20:192 Jun 09 03 VA Instantaneous Sag.
5 09:50:22:725 Jun 09 03 VB Instantaneous Sag.
6 09:50:25:258 Jun 09 03 VC Instantaneous Sag.
7 09:50:27:792 Jun 09 03 VA Instantaneous Sag.
8 09:50:30:325 Jun 09 03 VB Instantaneous Sag.
9 09:50:32:858 Jun 09 03 VC Instantaneous Sag.
Ok
Cancel

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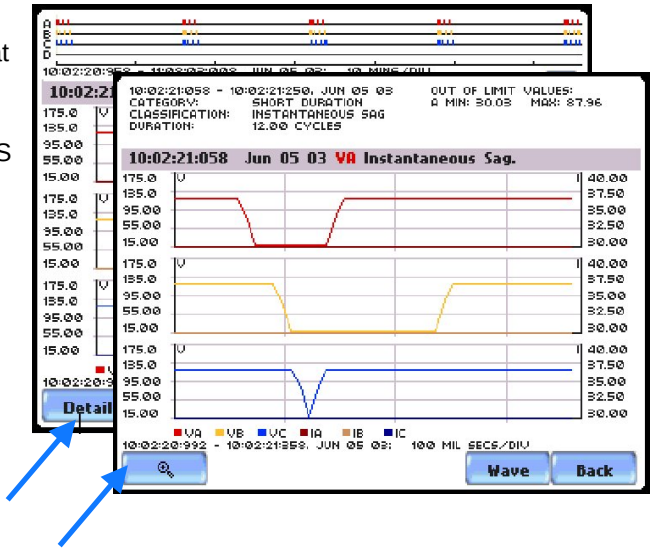
Viewing Events: Event Detail

- *Press: Detail*
- Event Details appear at the top of the screen
- To zoom in on the RMS plot,
- *Press: Magnify*


10:02:21:058 - 10:02:21:250, JUN 05 03
CATEGORY: SHORT DURATION
CLASSIFICATION: INSTANTANEOUS SAG
DURATION: 12.00 CYCLES
OUT OF LIMIT VALUES:
A MIN: 30.03 MAX: 87.96
10:02:21:058 Jun 05 03 VA Instantaneous Sag.
VA VB VC IA IB IC
10:02:20:992 - 10:02:21:258, JUN 05 03: 100 MIL SECS/DIV
Wave
Back

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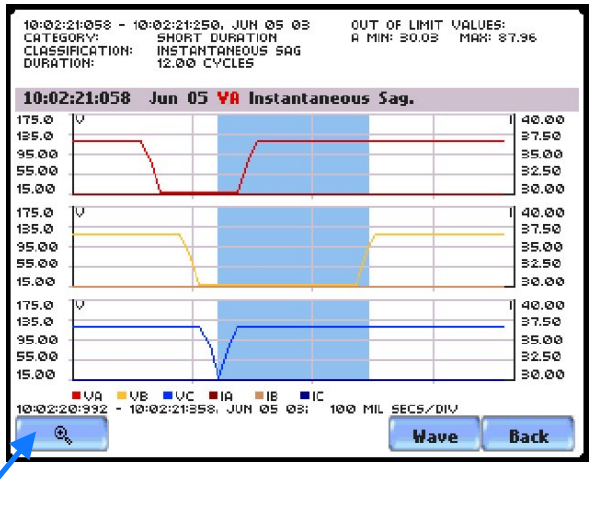
Viewing Events: Magnify

- In magnification mode, a blue box showing the area to zoom in on appears
- Drag the sides of the zoom box to expand or contract the graph
- *Press the magnify button* to zoom


10:02:21:058 - 10:02:21:250, JUN 05 03
CATEGORY: SHORT DURATION
CLASSIFICATION: INSTANTANEOUS SAG
DURATION: 12.00 CYCLES
OUT OF LIMIT VALUES:
A MIN: 30.03 MAX: 87.96
10:02:21:058 Jun 05 VA Instantaneous Sag.
VA VB VC IA IB IC
10:02:20:992 - 10:02:21:258, JUN 05 03: 100 MIL SECS/DIV
Wave
Back

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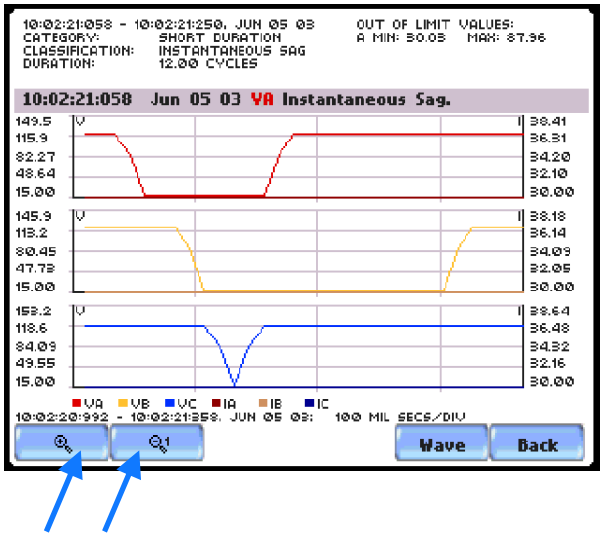
Viewing Events: Magnify

- The magnified plot can be zoomed further in or out using the (+) and (-) buttons
- Drag the sides of the zoom box to expand or contract the graph
- *Press the (+ or -)* magnify button to zoom in or out


10:02:21:058 - 10:02:21:250, JUN 05 03
CATEGORY: SHORT DURATION
CLASSIFICATION: INSTANTANEOUS SAG
DURATION: 12.00 CYCLES
OUT OF LIMIT VALUES:
A MIN: 80.03 MAX: 87.96
10:02:21:058 Jun 05 03 VA Instantaneous Sag.
VA VB VC IA IB IC
10:02:20:992 - 10:02:21:358, JUN 05 03: 100 MIL SECS/DIV
Wave
Back

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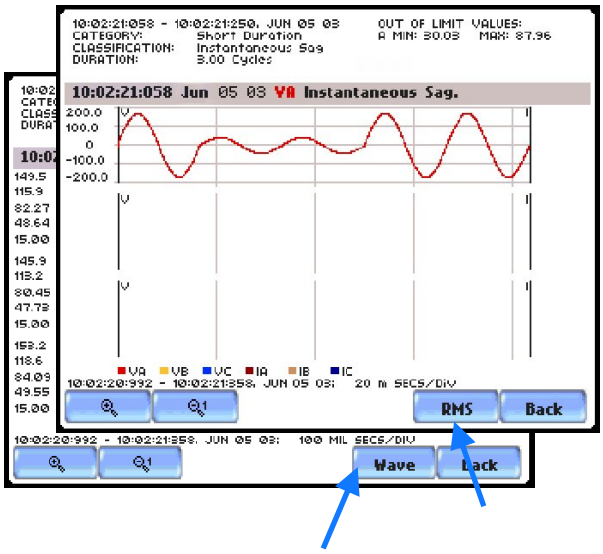
Viewing Events: Wave <-> RMS

- You can toggle back and forth between the wave (waveform capture) and RMS plot screens by *pressing the RMS/Wave button*
- Waveforms may be zoomed in on in the same manner as RMS plots


10:02:21:058 - 10:02:21:250, JUN 05 03
CATEGORY: Short Duration
CLASSIFICATION: Instantaneous Sag
DURATION: 3.00 Cycles
OUT OF LIMIT VALUES:
A MIN: 80.03 MAX: 87.96
10:02:21:058 Jun 05 03 VA Instantaneous Sag.
VA VB VC IA IB IC
10:02:20:992 - 10:02:21:358, JUN 05 03: 20 m SECS/DIV
RMS
Back
10:02:20:992 - 10:02:21:358, JUN 05 03: 100 MIL SECS/DIV
Wave
Back

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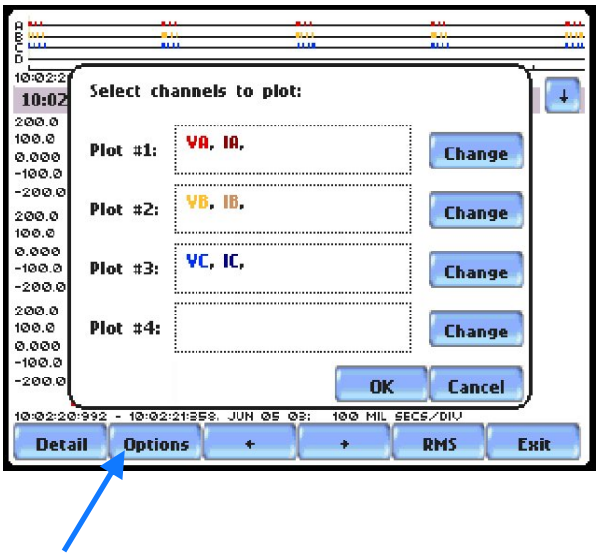
Viewing Events: Options

- *Press: Options* to change the channels that are plotted
- The event screen retains your settings, but reverts to defaults when a new monitoring session starts
- *Press: Exit* to return to Home Screen



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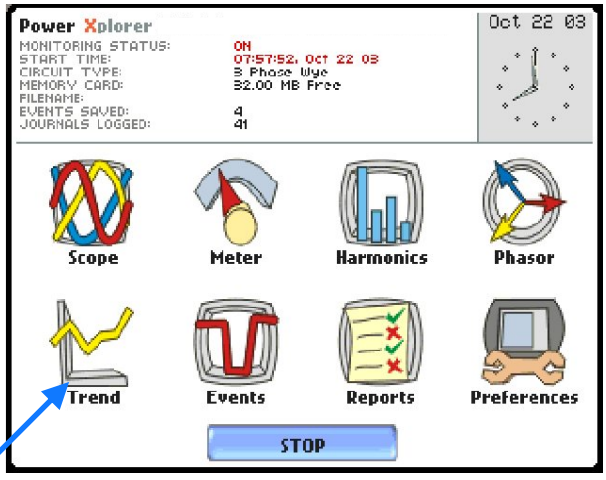
Viewing Trends

- *Press: Trend*
- A trend consists of the timed and threshold waveforms for the parameter on display



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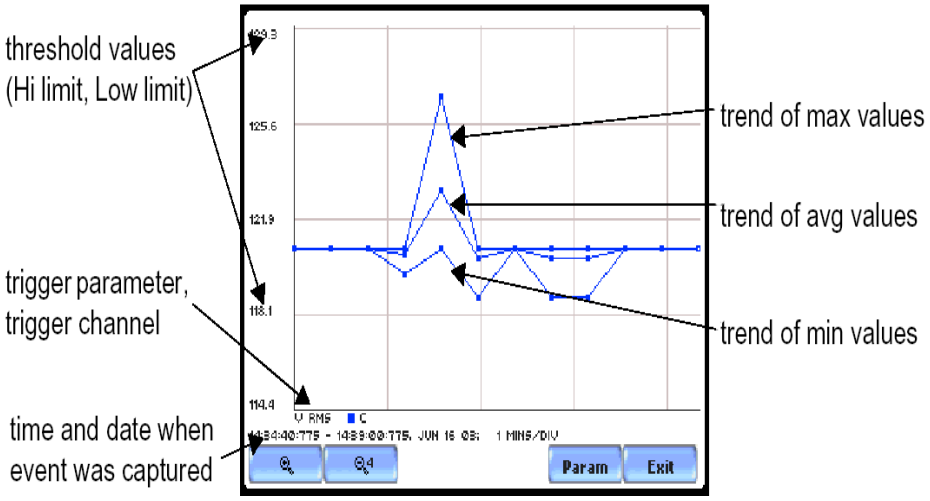
Viewing Trends: Screen Layout



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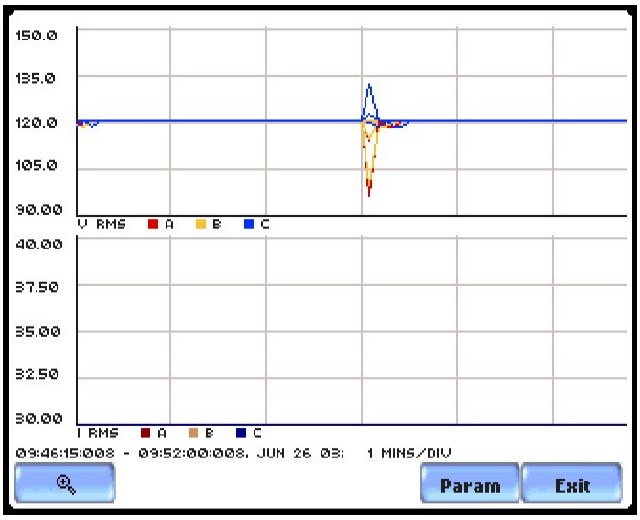
Viewing Trends:

- The default number of plots displayed in the trend screen is two
- *Press the Magnify* button to view plot coordinates in detail



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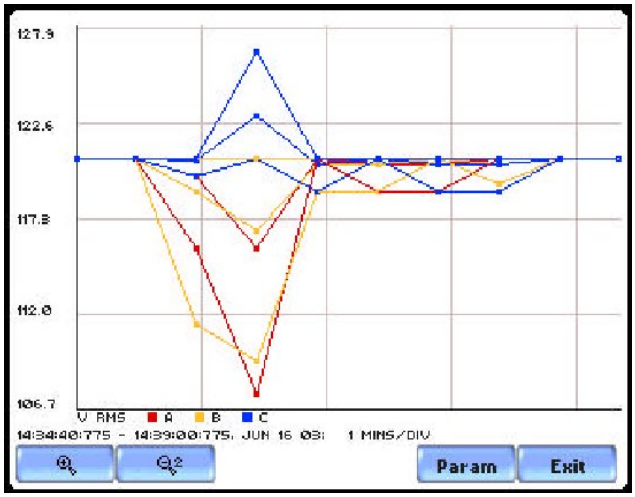
Viewing Trends: Magnified

- The magnified plot can be zoomed further in or out using the (+) and (-) buttons
- Drag the sides of the zoom box to expand or contract the graph
- Press the (+ or -) magnify button to zoom in or out



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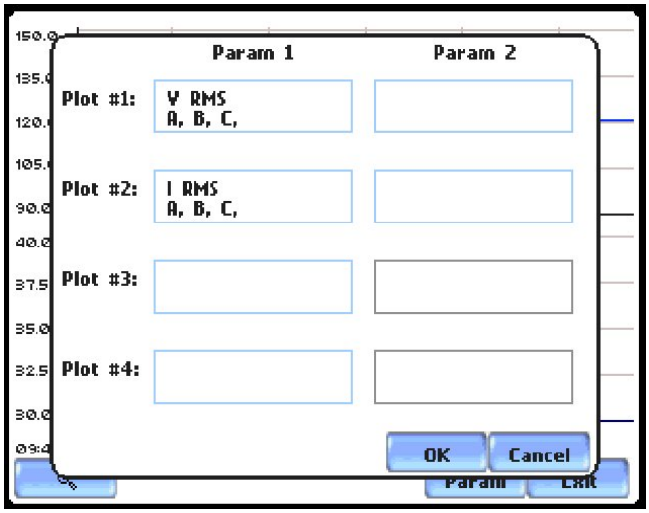
Viewing Trends: Parameter/Channel Selection

- *Press: Param*
- Press the parameter field you want to change



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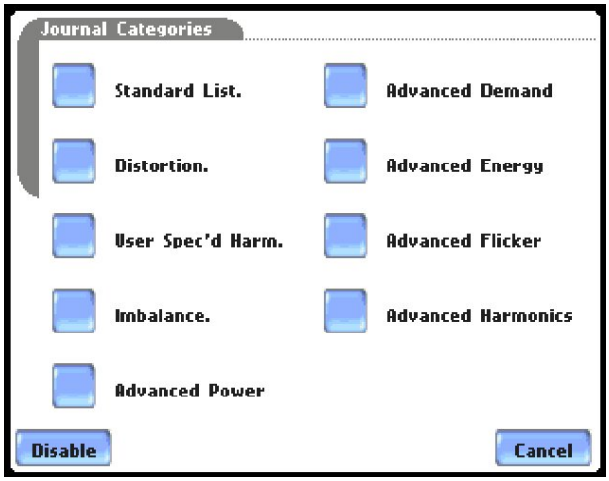
Viewing Trends: Parameter/Channel Selection

- *Press the category* from which you want to select parameters/ channels to plot
- Or *Press: Disable* to clear the parameter display on the previous screen and return to it
- *Cancel* returns to previous screen w/o changes



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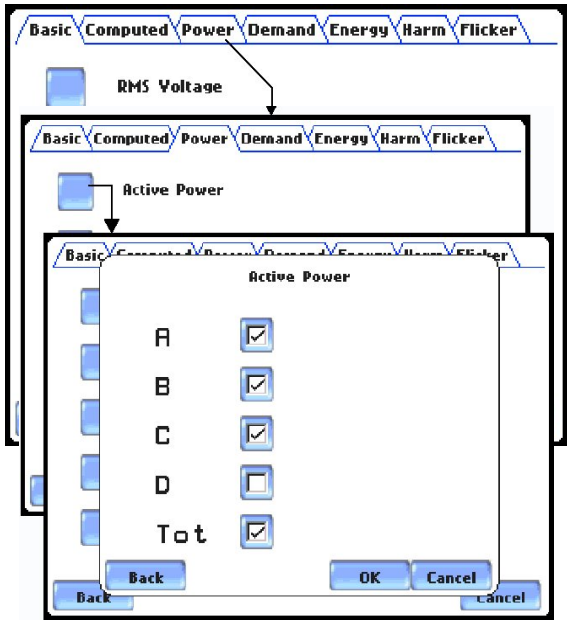
Viewing Trends: Parameter/Channel Selection

- Within the category, drill down to the parameter, and select channels to plot
- *Press: OK*



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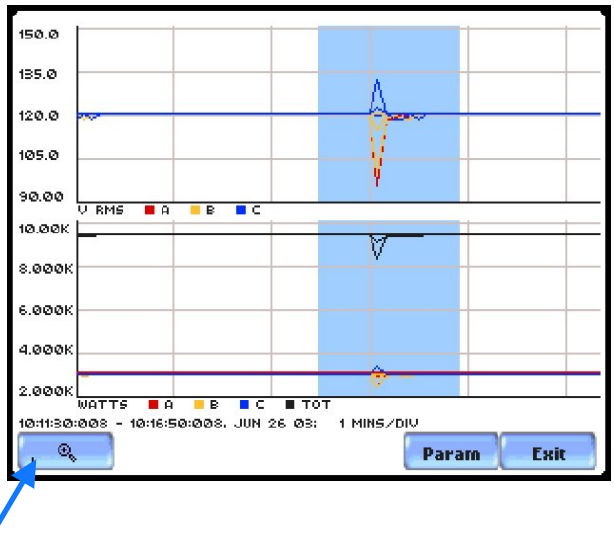
Viewing Trends: Parameter/Channel Selection

- The modified trend plots are displayed
- *Press: Magnify* to enlarge the area of interest
- Drag the sides of the zoom box to expand or contract the graph
- Press the (+ or -) magnify button to zoom in or out



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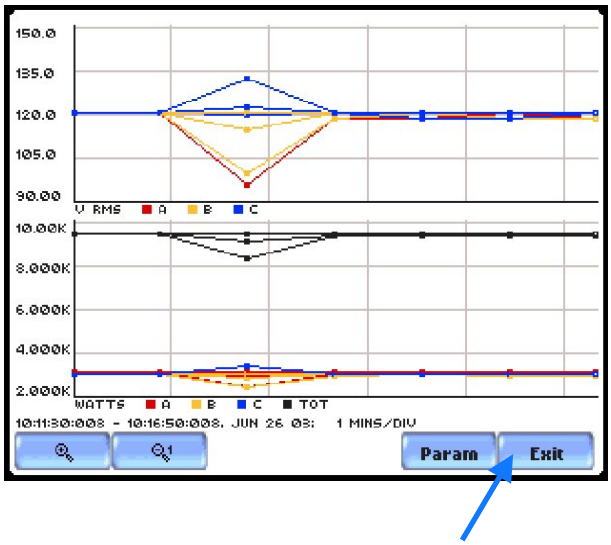
Viewing Trends: Plot Magnification

- The Magnified area is displayed
- *Press: Exit* to quit and return to the Home Screen



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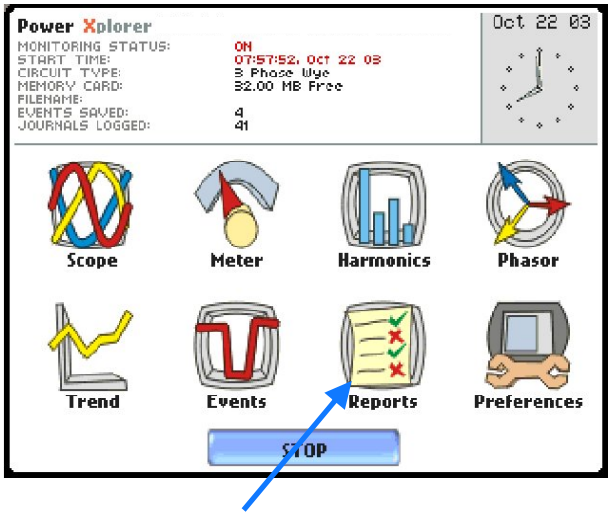
Viewing Reports

- *Press: Report*



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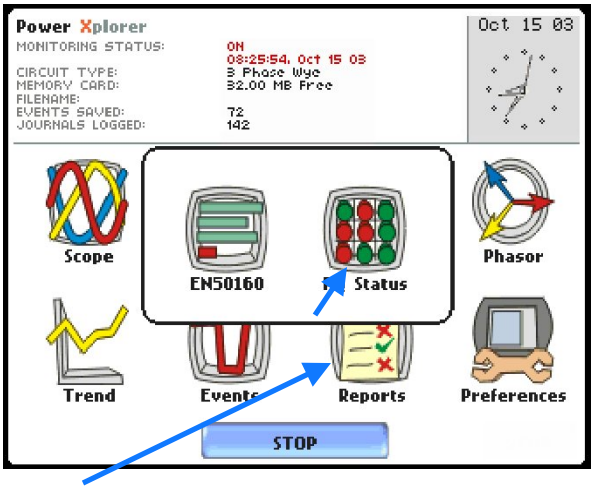
Viewing Reports

- *Reports present Quality of Service (QOS) data in either EN50160 format or simple PQ status*
- *Press: Report*
- *Press: Status*



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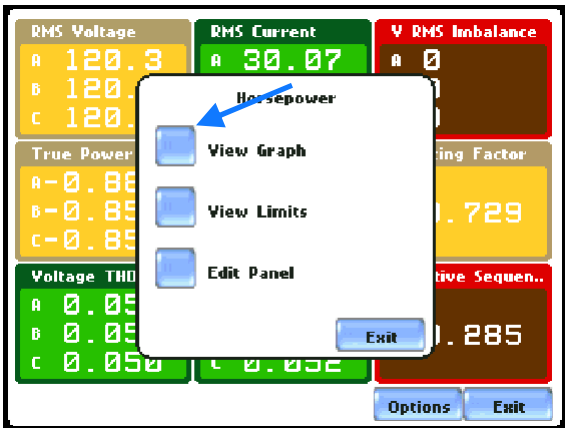
The Annunciator Panel

- Green indicates no events have occurred in that category since start of monitoring period or last time clear button was pressed
- Any other color indicates that thresholds have been passed.
- *Press:* A parameter and then *View Graph*



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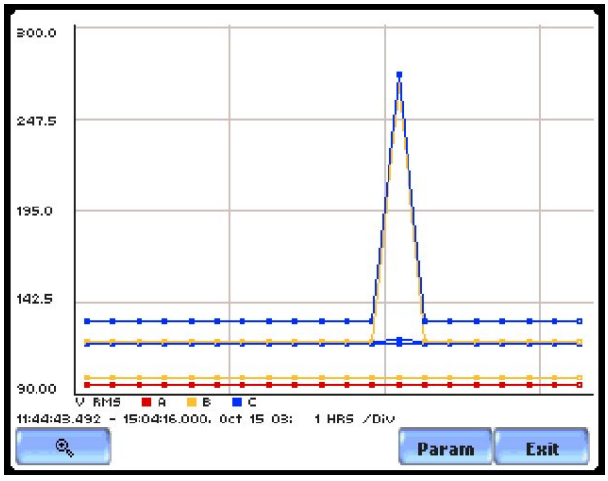
Viewing Reports: Status Details

- The chosen trend or event parameter(s) are plotted
- Magnification works the same as in trend mode
- Param selects parameters to graph the same as in trend mode
- *Press: Exit* to return to status screen
- *Press: Exit* again to return to Home screen



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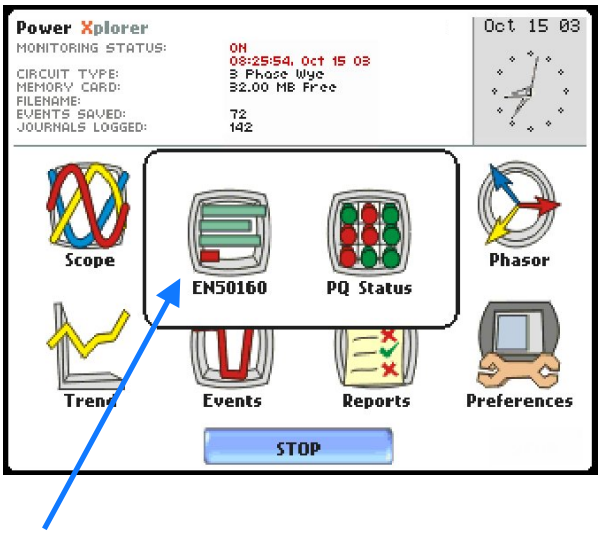
Viewing Reports

- Reports also present ***Quality of Service*** (QOS) data in EN50160 format
- *Press: EN50160*
- *Note: You must have collected data in EN50160 format (monitoring mode screen) to view it here*



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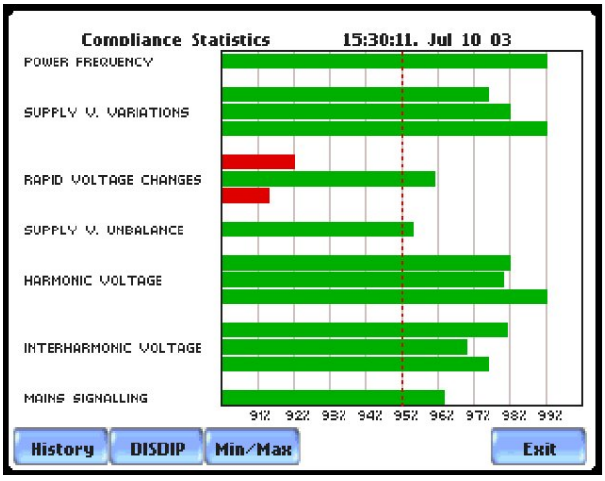
Viewing Reports: EN50160

- A bar chart displays the parameters required for determining compliance
- EN50160 evaluations require a 7-day minimum period
- Green bars indicate compliance, red bars indicate not compliant, black bars indicates incomplete period
- Select bars will show component detail when pressed
- See manual chapter 7 for EN50160 details



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